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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
HELIUM ACTIVITY
HELIUM RESEARCH CENTER
INTERNAL REPORT

COMPRESSIBILITY DATA FOR HELIUM AT 0° C AND PRESSURES TO 800

ATMOSPHERES FITTED TO AN EQUATION OF THE FORM

$$Z_r = 1 + BP_r + CP_r^2 + DP_r^3$$

BY

Ted C. Briggs

BRANCH

Fundamental Research

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HELIUM RESEARCH CENTER
INTERNAL REPORT

COMPRESSIBILITY DATA FOR HELIUM AT 0° C AND PRESSURES TO 800 ATMOSPHERES
FITTED TO AN EQUATION OF THE FORM $Z_r = 1 + BP_r + CP_r^2 + DP_r^3$

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ABSTRACT

The 0°C isobar compressibility data of Helium Research Center
 Bureau Report No. 10 (1962) were fitted to an equation of the form

$$Z_p = 1 + aP + bP^2 + cP^3$$
 using a non-linear least squares technique.
 Results of least squares treatment are presented.

INTRODUCTION

Twenty-two compressibility runs were made with Helium at 0°C .
 Data from the twenty-two runs were fitted to equation (1) by a
 least squares technique.

$$Z_p = 1 + aP + bP^2 + cP^3 \quad (1)$$

Y. S. Touloukian, Helium Research Center, Bureau of Mines,
 Amarillo, Texas.

20. Published elsewhere in parentheses refer to items in the list
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Work on manuscript completed August 1964.

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COMPRESSIBILITY DATA FOR HELIUM AT 0° C AND PRESSURES
TO 800 ATMOSPHERES FITTED TO AN EQUATION OF THE

$$\text{FORM } Z_r = 1 + BP_r + CP_r^2 + DP_r^3$$

by

Ted C. Briggs^{1/}

ABSTRACT

The 0° C helium compressibility data of Helium Research Center Internal Report No. 88 (3)^{2/} were fitted to an equation of the form $Z_r = 1 + BP_r + CP_r^2 + DP_r^3$ using a non-linear least squares technique. Results of least squares treatment are presented.

INTRODUCTION

Twenty-two compressibility runs were made with helium at 0° C. Data from the twenty-two runs were fitted to equation (1) by a least squares technique.

$$Z_r = 1 + BP_r + CP_r^2 = \left(\frac{Z_o}{P_o}\right) f_r N^r P_r \quad (1)$$

^{1/} Research chemist, Helium Research Center, Bureau of Mines, Amarillo, Texas.

^{2/} Underlined numbers in parentheses refer to items in the list of references at the end of this report.

- Z_r = compressibility factor at P_r
 P_r = pressure after the r th expansion
 B = constant evaluated from the experimental pressures
 C = constant evaluated from the experimental pressures
 P_o = pressure before the first expansion
 r = expansion number = R
 Z_o = compressibility factor at P_o
 f_r = factor to correct for elastic pressure distortion of
the compressibility bombs
 N = isothermal volume ratio at zero pressure

A description of the experimental apparatus and experimental procedure used to obtain data for the twenty-two runs, treatment of the experimental observations, and the results of the least squares fitting of the data to equation (1) were recorded in Helium Research Center Internal Report No. 88 (3).

Examination of the column of differences between the observed and calculated pressures of table 5 of Internal Report No. 88 (3) revealed that the signs of the residuals for the various runs were not random. The nonrandomness of the residuals suggested equation (1) did not adequately represent the experimental data.

The same experimental data for the twenty-two compressibility runs at 0° C were fitted to equation (2) using a least squares technique.

$$Z_r = 1 + BP_r + CP_r^2 + DP_r^3 = \left(\frac{Z_o}{P_o}\right) f_r N^r P_r \quad (2)$$

D = constant evaluated from the experimental pressures

Details of the method used in this least squares treatment of Burnett compressibility data can be found in Helium Research Center Internal Reports No. 85 (2) and No. 86 (1).

The extensive calculations required for the data treatment were carried out by using an IBM 1401 computer, and the results of the computer calculations were printed out directly on multilith masters.

RESULTS OF FITTING THE 0° C HELIUM COMPRESSIBILITY DATA TO EQUATION (2)

The pressure expansion numbers are listed in table 1 under the column heading R. The experimental pressures in absolute atmospheres, the calculated pressures in absolute atmospheres, the differences between the experimental pressures and the least squares calculated pressures, and the relative differences of the experimental and calculated pressures are printed out in table 1 for each of the twenty-two compressibility runs. The quantities are listed in "E format" ($5.361188596E-04 = 5.361188596 \times 10^{-4}$).

A weighting factor of 1 was used for all the calculations, and the sum of squares of the weighted residuals is printed out in table 1 for each run.

The least squares calculated constants for equation (2) (N, B, C, and D), and the standard errors of the constants (SN, SB, SC, and SD) are printed out in table 1 for each of the twenty-two runs.

$$Z = 1 + \frac{B}{T} + \frac{C}{T^2} + \frac{D}{T^3} + \frac{E}{T^4} + \frac{F}{T^5} + \frac{G}{T^6} + \frac{H}{T^7} + \frac{I}{T^8} + \frac{J}{T^9} + \frac{K}{T^{10}}$$

B = constant evaluated from the experimental pressure
Details of the method used in this least squares treatment of
Experimental compressibility data can be found in Ballou Research Center
Internal Reports No. 85 (2) and No. 86 (1).
The extensive calculations required for the data treatment were
carried out by using an IBM 1601 computer, and the results of the
computer calculations were printed out directly on magnetic tape.

RESULTS OF FITTING THE $P-V-T$ EQUATION DATA TO EQUATION (3)

The pressure expansion numbers are listed in Table 1 under the
column heading A. The experimental pressures in absolute atmospheres,
the calculated pressures in absolute atmospheres, the differences
between the experimental pressures and the least squares calculated
pressures, and the relative differences of the experimental and cal-
culated pressures are printed out in Table 1 for each of the tempera-
ture compressibility runs. The quantities are listed in "B Units".
(1.3015855E-04 = 0.00013015855)

A weighting factor of 1 was used for all the calculations, and
the sum of squares of the weighted residuals is printed out in Table
1 for each run.

The least squares calculated constants for equation (3) are
C, and D, and the standard errors of the constants E, F, G, H, I, J, K,
and L are printed out in Table 1 for each of the temperature runs.

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-1

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.4728895E&02	6.4728895E&02	0.00000E-99	0.00000E-99
1	2.8125289E&02	2.8125289E&02	7.18885E-06	2.55601E-08
2	1.3168470E&02	1.3168478E&02	-8.72145E-05	-6.62298E-07
3	6.3853510E&01	6.3853183E&01	3.27430E-04	5.12784E-06
4	3.1491659E&01	3.1491868E&01	-2.08617E-04	-6.62453E-06
5	1.5661273E&01	1.5661882E&01	-6.09214E-04	-3.88994E-05
6	7.8217009E-00	7.8215536E-00	1.47235E-04	1.88240E-05
7	3.9151145E-00	3.9141936E-00	9.20857E-04	2.35205E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.39918E-06

CONSTANTS AND STANDARD ERRORS

N	1.994104930E-00	SN	6.91275E-05
B	5.361188596E-04	SB	1.21414E-06
C	-6.944230880E-08	SC	3.12574E-09
D	1.909621205E-11	SD	2.76621E-12

VARIANCES AND COVARIANCES

S2N	4.77862E-09
S2B	1.47414E-12
S2C	9.77028E-18
S2D	7.65194E-24
S2BC	-3.76511E-15
S2BD	3.30739E-18
S2BN	-8.09421E-11
S2CD	-8.63582E-21
S2CN	2.00110E-13
S2DN	-1.73652E-16

TABLE 1 - EXPERIMENTAL PRESSURE, CALCULATED PRESSURE, CONSTANT, STANDARD ERROR, VARIANCE, AND COVARIANCES

RUN NO. 15-0-1

P, OBS., ATM.	P, CAL., ATM.	P, OBS., P. CAL.	P, OBS., P. CAL.
0.4738822203	0.4738822203	0.000000-00	0.000000-00
5.8152388203	5.8152388203	1.188888-00	1.188888-00
1.8188470803	1.8188470803	-0.151458-00	-0.033888-01
6.3833108201	6.3833108201	3.157848-00	3.157848-00
3.1491629201	3.1491629201	-5.088178-00	-0.036838-00
1.5061133201	1.5061133201	-0.001148-00	-3.084048-02
1.85110008-00	1.85110008-00	1.473328-00	1.885408-02
2.01211428-00	2.01211428-00	0.000000-00	2.250288-00

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.308188-00

CONSTANTS AND STANDARD ERRORS

0	1.00452100E-11	20	5.700518-12
1	2.30118829E-07	21	1.174148-00
2	1.994106430E-00	22	4.915108-03

VARIANCES AND COVARIANCES

22H	4.770628-00
22B	1.474197-12
22C	9.770588-18
22D	7.621948-24
22E	-3.782118-12
22F	3.307398-10
22G	-8.044518-11
22H	-8.044518-11
22I	-8.044518-11
22J	5.001108-13
22K	-1.730228-10

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-2

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.9039330E&02	6.9039330E&02	0.000000E-99	0.000000E-99
1	2.9760733E&02	2.9760732E&02	9.77942E-06	3.28601E-08
2	1.3883415E&02	1.3883427E&02	-1.25101E-04	-9.01086E-07
3	6.7203083E&01	6.7202556E&01	5.27348E-04	7.84709E-06
4	3.3114887E&01	3.3115530E&01	-6.42524E-04	-1.94029E-05
5	1.6462213E&01	1.6462457E&01	-2.43833E-04	-1.48116E-05
6	8.2197040E-00	8.2196494E-00	5.45774E-05	6.63983E-06
7	4.1139611E-00	4.1129921E-00	9.69016E-04	2.35543E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.70810E-06

CONSTANTS AND STANDARD ERRORS

N	1.994100354E-00	SN	7.23983E-05
B	5.360446432E-04	SB	1.20448E-06
C	-6.891640779E-08	SC	2.91792E-09
D	1.833273902E-11	SD	2.43035E-12

VARIANCES AND COVARIANCES

S2N	5.24152E-09
S2B	1.45078E-12
S2C	8.51429E-18
S2D	5.90664E-24
S2BC	-3.48676E-15
S2BD	2.88289E-18
S2BN	-8.41015E-11
S2CD	-7.08304E-21
S2CN	1.95645E-13
S2DN	-1.59821E-16

TABLE 1 - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. ME-0-5

R	P, 0.02, 1 ATM.	P, CAL., 1 ATM.	P, 0.02, 1 ATM.	P, 0.02, 1 ATM.
0	4.903930E-02	4.903930E-02	0.0000E-00	0.0000E-00
1	2.87073E-02	2.87073E-02	0.719E-00	0.719E-00
2	1.36834E-02	1.36834E-02	-1.521E-00	-1.521E-00
3	0.75030E-02	0.75030E-02	0.571E-00	0.571E-00
4	3.31148E-02	3.31148E-02	-0.453E-00	-0.453E-00
5	1.04057E-02	1.04057E-02	-2.480E-00	-2.480E-00
6	0.21700E-00	0.21700E-00	0.421E-00	0.421E-00
7	4.11398E-00	4.11398E-00	0.800E-00	0.800E-00
8	5.3393E-00	5.3393E-00	0.439E-00	0.439E-00
9	1.4811E-00	1.4811E-00	-1.481E-00	-1.481E-00
10	-1.4811E-00	-1.4811E-00	1.481E-00	1.481E-00
11	7.8470E-01	7.8470E-01	0.000E-00	0.000E-00
12	0.000E-00	0.000E-00	0.000E-00	0.000E-00
13	0.000E-00	0.000E-00	0.000E-00	0.000E-00
14	0.000E-00	0.000E-00	0.000E-00	0.000E-00
15	0.000E-00	0.000E-00	0.000E-00	0.000E-00
16	0.000E-00	0.000E-00	0.000E-00	0.000E-00
17	0.000E-00	0.000E-00	0.000E-00	0.000E-00
18	0.000E-00	0.000E-00	0.000E-00	0.000E-00
19	0.000E-00	0.000E-00	0.000E-00	0.000E-00
20	0.000E-00	0.000E-00	0.000E-00	0.000E-00

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.70810E-00

CONSTANTS AND STANDARD ERRORS

0	1.993239E-11	2.0	2.4993E-15
1	0.891460E-00	21	2.9173E-00
2	0.360464E-00	22	1.5048E-00
3	1.994100E-00	23	1.5393E-00

VARIANCES AND COVARIANCES

20N	-1.2993E-10
21N	1.9949E-10
22N	1.9949E-10
23N	-8.4101E-11
24N	-8.4101E-11
25N	2.6020E-10
26N	-9.4647E-10
27N	2.8060E-10
28N	0.2145E-10
29N	1.4207E-10
30N	2.3415E-09

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-3

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.0128236E&02	7.0128236E&02	0.00000E-99	0.00000E-99
1	3.0170799E&02	3.0170798E&02	1.06401E-05	3.52663E-08
2	1.4061376E&02	1.4061390E&02	-1.33782E-04	-9.51419E-07
3	6.8033559E&01	6.8033024E&01	5.35729E-04	7.87448E-06
4	3.3517320E&01	3.3517838E&01	-5.18572E-04	-1.54717E-05
5	1.6660572E&01	1.6661089E&01	-5.17513E-04	-3.10621E-05
6	8.3186011E-00	8.3186642E-00	-6.30330E-05	-7.57736E-06
7	4.1639855E-00	4.1625875E-00	1.39802E-03	3.35741E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 2.80019E-06

CONSTANTS AND STANDARD ERRORS

N	1.994013206E-00	SN	9.15046E-05
B	5.374195870E-04	SB	1.50283E-06
C	-7.090761621E-08	SC	3.58710E-09
D	1.932476211E-11	SD	2.94402E-12

VARIANCES AND COVARIANCES

S2N	8.37309E-09
S2B	2.25851E-12
S2C	1.28672E-17
S2D	8.66727E-24
S2BC	-5.34810E-15
S2BD	4.35728E-18
S2BN	-1.32628E-10
S2CD	-1.05478E-20
S2CN	3.03985E-13
S2DN	-2.44705E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-4

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.0574520E&02	7.0574520E&02	0.000000E-99	0.000000E-99
1	3.0337137E&02	3.0337136E&02	5.64098E-06	1.85943E-08
2	1.4133952E&02	1.4133959E&02	-7.37015E-05	-5.21450E-07
3	6.8373652E&01	6.8373330E&01	3.22066E-04	4.71038E-06
4	3.3682135E&01	3.3682559E&01	-4.24254E-04	-1.25958E-05
5	1.6741807E&01	1.6741990E&01	-1.82718E-04	-1.09139E-05
6	8.3590666E-00	8.3586743E-00	3.92285E-04	4.69292E-05
7	4.1826390E-00	4.1824414E-00	1.97639E-04	4.72523E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 5.15517E-07

CONSTANTS AND STANDARD ERRORS

N	1.994081748E-00	SN	3.90576E-05
B	5.361394634E-04	SB	6.37993E-07
C	-6.840318929E-08	SC	1.51389E-09
D	1.763751763E-11	SD	1.23515E-12

VARIANCES AND COVARIANCES

S2N	1.52550E-09
S2B	4.07035E-13
S2C	2.29186E-18
S2D	1.52561E-24
S2BC	-9.58197E-16
S2BD	7.76078E-19
S2BN	-2.40327E-11
S2CD	-1.86765E-21
S2CN	5.47603E-14
S2DN	-4.38223E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-5

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.9787955E&02	6.9787955E&02	0.00000E-99	0.00000E-99
1	3.0041472E&02	3.0041471E&02	9.96965E-06	3.31863E-08
2	1.4005441E&02	1.4005454E&02	-1.24516E-04	-8.89059E-07
3	6.7772168E&01	6.7771677E&01	4.90833E-04	7.24240E-06
4	3.3390191E&01	3.3390629E&01	-4.37985E-04	-1.31171E-05
5	1.6597313E&01	1.6597863E&01	-5.49943E-04	-3.31345E-05
6	8.2868246E-00	8.2869082E-00	-8.36152E-05	-1.00901E-05
7	4.1479419E-00	4.1465544E-00	1.38747E-03	3.34496E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 2.68285E-06

CONSTANTS AND STANDARD ERRORS

N	1.994105641E-00	SN	8.99370E-05
B	5.365329037E-04	SB	1.48292E-06
C	-7.014594551E-08	SC	3.55620E-09
D	1.938267144E-11	SD	2.93217E-12

VARIANCES AND COVARIANCES

S2N	8.08867E-09
S2B	2.19905E-12
S2C	1.26466E-17
S2D	8.59765E-24
S2BC	-5.23179E-15
S2BD	4.28223E-18
S2BN	-1.28627E-10
S2CD	-1.04148E-20
S2CN	2.96206E-13
S2DN	-2.39543E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-6

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS.-P, CAL.	$\frac{P, OBS.-P, CAL.}{P, OBS.}$
0	7.0298868E&02	7.0298868E&02	0.00000E-99	0.00000E-99
1	3.0233845E&02	3.0233843E&02	1.28907E-05	4.26369E-08
2	1.4088835E&02	1.4088851E&02	-1.63583E-04	-1.16108E-06
3	6.8163698E&01	6.8163029E&01	6.68810E-04	9.81182E-06
4	3.3579834E&01	3.3580536E&01	-7.01802E-04	-2.08995E-05
5	1.6690781E&01	1.6691382E&01	-6.00959E-04	-3.60055E-05
6	8.3334615E-00	8.3332743E-00	1.87184E-04	2.24617E-05
7	4.1709998E-00	4.1696172E-00	1.38264E-03	3.31489E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 3.27465E-06

CONSTANTS AND STANDARD ERRORS

N	1.994160628E-00	SN	9.87659E-05
B	5.347946028E-04	SB	1.61828E-06
C	-6.487982103E-08	SC	3.85431E-09
D	1.462940356E-11	SD	3.15624E-12

VARIANCES AND COVARIANCES

S2N	9.75471E-09
S2B	2.61885E-12
S2C	1.48557E-17
S2D	9.96188E-24
S2BC	-6.18795E-15
S2BD	5.03027E-18
S2BN	-1.54149E-10
S2CD	-1.21505E-20
S2CN	3.52548E-13
S2DN	-2.83165E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-7

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	7.0208680E&02	7.0208680E&02	0.000000E-99	0.000000E-99
1	3.0200812E&02	3.0200812E&02	4.25962E-06	1.41043E-08
2	1.4074887E&02	1.4074893E&02	-5.42586E-05	-3.85499E-07
3	6.8097837E&01	6.8097612E&01	2.25243E-04	3.30764E-06
4	3.3548005E&01	3.3548268E&01	-2.63538E-04	-7.85557E-06
5	1.6674984E&01	1.6675074E&01	-8.99902E-05	-5.39672E-06
6	8.3248260E-00	8.3249383E-00	-1.12353E-04	-1.34961E-05
7	4.1658969E-00	4.1653342E-00	5.62664E-04	1.35064E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 4.60461E-07

CONSTANTS AND STANDARD ERRORS

N	1.994221537E-00	SN	3.70743E-05
B	5.344341608E-04	SB	6.08047E-07
C	-6.528667964E-08	SC	1.44999E-09
D	1.530120221E-11	SD	1.18881E-12

VARIANCES AND COVARIANCES

S2N	1.37450E-09
S2B	3.69721E-13
S2C	2.10249E-18
S2D	1.41328E-24
S2BC	-8.74682E-16
S2BD	7.11897E-19
S2BN	-2.17414E-11
S2CD	-1.72171E-21
S2CN	4.97858E-14
S2DN	-4.00356E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-8

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.0061130E&02	7.0061130E&02	0.000000E-99	0.000000E-99
1	3.0144846E&02	3.0144845E&02	5.51140E-06	1.82830E-08
2	1.4050824E&02	1.4050831E&02	-6.99893E-05	-4.98115E-07
3	6.7985497E&01	6.7985210E&01	2.87501E-04	4.22886E-06
4	3.3494053E&01	3.3494363E&01	-3.10769E-04	-9.27835E-06
5	1.6648795E&01	1.6649023E&01	-2.28571E-04	-1.37289E-05
6	8.3123743E-00	8.3123250E-00	4.93463E-05	5.93649E-06
7	4.1598289E-00	4.1592274E-00	6.01499E-04	1.44597E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 6.00645E-07

CONSTANTS AND STANDARD ERRORS

N	1.994118630E-00	SN	4.24145E-05
B	5.359183887E-04	SB	6.97011E-07
C	-6.911866851E-08	SC	1.66539E-09
D	1.866578011E-11	SD	1.36812E-12

VARIANCES AND COVARIANCES

S2N	1.79899E-09
S2B	4.85824E-13
S2C	2.77354E-18
S2D	1.87175E-24
S2BC	-1.15160E-15
S2BD	9.39137E-19
S2BN	-2.85123E-11
S2CD	-2.27572E-21
S2CN	6.54181E-14
S2DN	-5.27106E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-9

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.8457479E&02	6.8457479E&02	0.00000E-99	0.00000E-99
1	2.9540775E&02	2.9540775E&02	2.39915E-06	8.12150E-09
2	1.3787047E&02	1.3787048E&02	-1.72805E-05	-1.25338E-07
3	6.6752988E&01	6.6753056E&01	-6.81255E-05	-1.02056E-06
4	3.2896560E&01	3.2895811E&01	7.49021E-04	2.27689E-05
5	1.6350585E&01	1.6351971E&01	-1.38578E-03	-8.47546E-05
6	8.1629533E-00	8.1632520E-00	-2.98652E-04	-3.65862E-05
7	4.0856389E-00	4.0839944E-00	1.64453E-03	4.02515E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 5.28007E-06

CONSTANTS AND STANDARD ERRORS

N	1.994563189E-00	SN	1.28225E-04
B	5.291090411E-04	SB	2.14640E-06
C	-5.230765870E-08	SC	5.24277E-09
D	4.528069539E-12	SD	4.40184E-12

VARIANCES AND COVARIANCES

S2N	1.64417E-08
S2B	4.60707E-12
S2C	2.74867E-17
S2D	1.93761E-23
S2BC	-1.11640E-14
S2BD	9.30472E-18
S2BN	-2.65431E-10
S2CD	-2.30499E-20
S2CN	6.22583E-13
S2DN	-5.12660E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-10

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.0727559E&02	7.0727559E&02	0.000000E-99	0.000000E-99
1	3.0394992E&02	3.0394992E&02	-3.71980E-06	-1.22382E-08
2	1.4159267E&02	1.4159262E&02	5.46836E-05	3.86203E-07
3	6.8490921E&01	6.8491226E&01	-3.05618E-04	-4.46216E-06
4	3.3738977E&01	3.3738230E&01	7.47242E-04	2.21477E-05
5	1.6767501E&01	1.6768271E&01	-7.69300E-04	-4.58804E-05
6	8.3712273E-00	8.3710325E-00	1.94876E-04	2.32792E-05
7	4.1883028E-00	4.1882232E-00	7.95664E-05	1.89972E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.29090E-06

CONSTANTS AND STANDARD ERRORS

N	1.994284259E-00	SN	6.17038E-05
B	5.339012082E-04	SB	1.00569E-06
C	-6.442053062E-08	SC	2.38181E-09
D	1.473351037E-11	SD	1.93936E-12

VARIANCES AND COVARIANCES

S2N	3.80736E-09
S2B	1.01142E-12
S2C	5.67305E-18
S2D	3.76112E-24
S2BC	-2.37640E-15
S2BD	1.92085E-18
S2BN	-5.98491E-11
S2CD	-4.61367E-21
S2CN	1.36108E-13
S2DN	-1.08702E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-11

R	P,OBS., ATM.	P,CAL., ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.0340360E&02	7.0340360E&02	0.000000E-99	0.000000E-99
1	3.0249876E&02	3.0249876E&02	4.13587E-06	1.36723E-08
2	1.4096179E&02	1.4096184E&02	-5.17086E-05	-3.66827E-07
3	6.8196393E&01	6.8196193E&01	2.00721E-04	2.94329E-06
4	3.3595563E&01	3.3595697E&01	-1.34226E-04	-3.99537E-06
5	1.6697915E&01	1.6698384E&01	-4.69838E-04	-2.81375E-05
6	8.3369834E-00	8.3365248E-00	4.58634E-04	5.50120E-05
7	4.1713507E-00	4.1711267E-00	2.24016E-04	5.37036E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 5.42274E-07

CONSTANTS AND STANDARD ERRORS

N	1.994213518E-00	SN	4.01723E-05
B	5.349595430E-04	SB	6.57863E-07
C	-6.675389830E-08	SC	1.56603E-09
D	1.657850192E-11	SD	1.28169E-12

VARIANCES AND COVARIANCES

S2N	1.61381E-09
S2B	4.32784E-13
S2C	2.45245E-18
S2D	1.64274E-24
S2BC	-1.02207E-15
S2BD	8.30400E-19
S2BN	-2.54883E-11
S2CD	-2.00477E-21
S2CN	5.82630E-14
S2DN	-4.67708E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-12

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	6.9905324E&02	6.9905324E&02	0.00000E-99	0.00000E-99
1	3.0086678E&02	3.0086678E&02	1.36011E-06	4.52064E-09
2	1.4025209E&02	1.4025211E&02	-1.12450E-05	-8.01775E-08
3	6.7865373E&01	6.7865392E&01	-1.89750E-05	-2.79598E-07
4	3.3435772E&01	3.3435426E&01	3.46675E-04	1.03684E-05
5	1.6618379E&01	1.6619108E&01	-7.28224E-04	-4.38204E-05
6	8.2969111E-00	8.2968890E-00	2.20475E-05	2.65732E-06
7	4.1518777E-00	4.1512022E-00	6.75482E-04	1.62693E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.10774E-06

CONSTANTS AND STANDARD ERRORS

N	1.994289860E-00	SN	5.77129E-05
B	5.335874740E-04	SB	9.49847E-07
C	-6.350558279E-08	SC	2.27443E-09
D	1.393544536E-11	SD	1.87236E-12

VARIANCES AND COVARIANCES

S2N	3.33078E-09
S2B	9.02210E-13
S2C	5.17305E-18
S2D	3.50575E-24
S2BC	-2.14325E-15
S2BD	1.75149E-18
S2BN	-5.28692E-11
S2CD	-4.25345E-21
S2CN	1.21565E-13
S2DN	-9.81560E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-13

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.1102445E&02	7.1102445E&02	0.000000E-99	0.000000E-99
1	3.0535233E&02	3.0535226E&02	7.01806E-05	2.29835E-07
2	1.4213544E&02	1.4213637E&02	-9.21671E-04	-6.48445E-06
3	6.8777416E&01	6.8773377E&01	4.03862E-03	5.87202E-05
4	3.3877134E&01	3.3882634E&01	-5.49968E-03	-1.62342E-04
5	1.6837357E&01	1.6838452E&01	-1.09532E-03	-6.50532E-05
6	8.4059564E-00	8.4037746E-00	2.18178E-03	2.59551E-04
7	4.2075898E-00	4.2030250E-00	4.56474E-03	1.08488E-03

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 7.42082E-05

CONSTANTS AND STANDARD ERRORS

N	1.995260954E-00	SN	4.65937E-04
B	5.031886651E-04	SB	7.53695E-06
C	2.938049137E-08	SC	1.77670E-08
D	-6.797656002E-11	SD	1.43950E-11

VARIANCES AND COVARIANCES

S2N	2.17097E-07
S2B	5.68056E-11
S2C	3.15667E-16
S2D	2.07218E-22
S2BC	-1.32846E-13
S2BD	1.06849E-16
S2BN	-3.38673E-09
S2CD	-2.55451E-19
S2CN	7.66591E-12
S2DN	-6.09204E-15

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-14

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.9853895E&02	6.9853895E&02	0.00000E-99	0.00000E-99
1	3.0067567E&02	3.0067566E&02	7.52292E-06	2.50200E-08
2	1.4016953E&02	1.4016962E&02	-9.58683E-05	-6.83945E-07
3	6.7826865E&01	6.7826467E&01	3.98071E-04	5.86893E-06
4	3.3416347E&01	3.3416801E&01	-4.54229E-04	-1.35930E-05
5	1.6609979E&01	1.6610230E&01	-2.50927E-04	-1.51070E-05
6	8.2927140E-00	8.2926848E-00	2.92619E-05	3.52863E-06
7	4.1500376E-00	4.1492239E-00	8.13731E-04	1.96078E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.10001E-06

CONSTANTS AND STANDARD ERRORS

N	1.994223593E-00	SN	5.75442E-05
B	5.346487378E-04	SB	9.47783E-07
C	-6.604315507E-08	SC	2.27096E-09
D	1.599945605E-11	SD	1.87078E-12

VARIANCES AND COVARIANCES

S2N	3.31133E-09
S2B	8.98292E-13
S2C	5.15727E-18
S2D	3.49982E-24
S2BC	-2.13533E-15
S2BD	1.74620E-18
S2BN	-5.26002E-11
S2CD	-4.24336E-21
S2CN	1.21025E-13
S2DN	-9.77863E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-15

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	7.0725396E&02	7.0725396E&02	0.000000E-99	0.000000E-99
1	3.0393974E&02	3.0393974E&02	5.45062E-06	1.79332E-08
2	1.4158487E&02	1.4158493E&02	-6.67456E-05	-4.71417E-07
3	6.8487098E&01	6.8486852E&01	2.45783E-04	3.58875E-06
4	3.3735978E&01	3.3736098E&01	-1.20224E-04	-3.56370E-06
5	1.6766788E&01	1.6767326E&01	-5.37189E-04	-3.20389E-05
6	8.3707330E-00	8.3706461E-00	8.68669E-05	1.03774E-05
7	4.1888843E-00	4.1880801E-00	8.04179E-04	1.91979E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.02217E-06

CONSTANTS AND STANDARD ERRORS

N	1.994256630E-00	SN	5.49104E-05
B	5.343897700E-04	SB	8.95060E-07
C	-6.496332459E-08	SC	2.11979E-09
D	1.494396759E-11	SD	1.72604E-12

VARIANCES AND COVARIANCES

S2N	3.01516E-09
S2B	8.01133E-13
S2C	4.49351E-18
S2D	2.97924E-24
S2BC	-1.88230E-15
S2BD	1.52150E-18
S2BN	-4.74010E-11
S2CD	-3.65447E-21
S2CN	1.07798E-13
S2DN	-8.60952E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-16

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	7.0575241E&02	7.0575241E&02	0.00000E-99	0.00000E-99
1	3.0337578E&02	3.0337578E&02	1.85452E-06	6.11296E-09
2	1.4134198E&02	1.4134200E&02	-2.36745E-05	-1.67498E-07
3	6.8374213E&01	6.8374115E&01	9.80058E-05	1.43337E-06
4	3.3681291E&01	3.3681399E&01	-1.07433E-04	-3.18969E-06
5	1.6740047E&01	1.6740132E&01	-8.45180E-05	-5.04885E-06
6	8.3570058E-00	8.3569552E-00	5.05869E-05	6.05324E-06
7	4.1813150E-00	4.1811436E-00	1.71467E-04	4.10080E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 6.08144E-08

CONSTANTS AND STANDARD ERRORS

N	1.994312169E-00	SN	1.34170E-05
B	5.335040069E-04	SB	2.19064E-07
C	-6.337225197E-08	SC	5.19879E-10
D	1.387081755E-11	SD	4.24165E-13

VARIANCES AND COVARIANCES

S2N	1.80017E-10
S2B	4.79892E-14
S2C	2.70274E-19
S2D	1.79916E-25
S2BC	-1.12984E-16
S2BD	9.15115E-20
S2BN	-2.83470E-12
S2CD	-2.20250E-22
S2CN	6.45986E-15
S2DN	-5.16962E-18

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-17

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.9911233E&02	6.9911233E&02	0.00000E-99	0.00000E-99
1	3.0088594E&02	3.0088594E&02	-7.76368E-07	-2.58027E-09
2	1.4025861E&02	1.4025860E&02	1.06708E-05	7.60797E-08
3	6.7867489E&01	6.7867542E&01	-5.31910E-05	-7.83748E-07
4	3.3436121E&01	3.3436011E&01	1.09839E-04	3.28505E-06
5	1.6619056E&01	1.6619161E&01	-1.04971E-04	-6.31635E-06
6	8.2968869E-00	8.2967958E-00	9.10776E-05	1.09773E-05
7	4.1510115E-00	4.1510950E-00	-8.34544E-05	-2.01046E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 4.12873E-08

CONSTANTS AND STANDARD ERRORS

N	1.994319395E-00	SN	1.11415E-05
B	5.335331716E-04	SB	1.83351E-07
C	-6.339454168E-08	SC	4.39012E-10
D	1.383291980E-11	SD	3.61378E-13

VARIANCES AND COVARIANCES

S2N	1.24133E-10
S2B	3.36178E-14
S2C	1.92731E-19
S2D	1.30594E-25
S2BC	-7.98560E-17
S2BD	6.52546E-20
S2BN	-1.97016E-12
S2CD	-1.58458E-22
S2CN	4.52984E-15
S2DN	-3.65727E-18

TABLE I - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-14

0	1	2	3	4	5	6	7
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00
0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00	0.000000-00

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 4158436-66

CONSTANTS AND STANDARD ERRORS

0	1	2	3	4	5	6	7
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11
1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11	1.28459190E-11

VARIANCES AND COVARIANCES

25A	1.28459190E-11
25B	1.28459190E-11
25C	1.28459190E-11
25D	1.28459190E-11
25E	1.28459190E-11
25F	1.28459190E-11
25G	1.28459190E-11
25H	1.28459190E-11
25I	1.28459190E-11
25J	1.28459190E-11
25K	1.28459190E-11
25L	1.28459190E-11
25M	1.28459190E-11
25N	1.28459190E-11
25O	1.28459190E-11
25P	1.28459190E-11
25Q	1.28459190E-11
25R	1.28459190E-11
25S	1.28459190E-11
25T	1.28459190E-11
25U	1.28459190E-11
25V	1.28459190E-11
25W	1.28459190E-11
25X	1.28459190E-11
25Y	1.28459190E-11
25Z	1.28459190E-11

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-18

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	7.0498797E&02	7.0498797E&02	0.000000E-99	0.000000E-99
1	3.0309166E&02	3.0309167E&02	-2.99395E-06	-9.87803E-09
2	1.4121823E&02	1.4121820E&02	3.42711E-05	2.42681E-07
3	6.8316532E&01	6.8316634E&01	-1.02819E-04	-1.50504E-06
4	3.3653188E&01	3.3653236E&01	-4.77297E-05	-1.41828E-06
5	1.6726144E&01	1.6725862E&01	2.82041E-04	1.68623E-05
6	8.3501239E-00	8.3495967E-00	5.27150E-04	6.31308E-05
7	4.1762502E-00	4.1773181E-00	-1.06788E-03	-2.55704E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.51185E-06

CONSTANTS AND STANDARD ERRORS

N	1.994394407E-00	SN	6.69573E-05
B	5.322844433E-04	SB	1.09403E-06
C	-6.060369445E-08	SC	2.59909E-09
D	1.161922911E-11	SD	2.12274E-12

VARIANCES AND COVARIANCES

S2N	4.48329E-09
S2B	1.19690E-12
S2C	6.75529E-18
S2D	4.50606E-24
S2BC	-2.82095E-15
S2BD	2.28715E-18
S2BN	-7.06486E-11
S2CD	-5.51061E-21
S2CN	1.61168E-13
S2DN	-1.29109E-16

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-19

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	6.9586241E&02	6.9586241E&02	0.000000E-99	0.000000E-99
1	2.9965869E&02	2.9965869E&02	-6.03195E-07	-2.01294E-09
2	1.3972241E&02	1.3972240E&02	1.20424E-05	8.61883E-08
3	6.7615486E&01	6.7615582E&01	-9.54432E-05	-1.41155E-06
4	3.3314160E&01	3.3313842E&01	3.18756E-04	9.56821E-06
5	1.6558741E&01	1.6559082E&01	-3.40774E-04	-2.05797E-05
6	8.2667975E-00	8.2670540E-00	-2.56492E-04	-3.10268E-05
7	4.1368299E-00	4.1363245E-00	5.05336E-04	1.22155E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 5.48141E-07

CONSTANTS AND STANDARD ERRORS

N	1.994273282E-00	SN	4.07534E-05
B	5.346326295E-04	SB	6.73381E-07
C	-6.583531445E-08	SC	1.61937E-09
D	1.579513130E-11	SD	1.33885E-12

VARIANCES AND COVARIANCES

S2N	1.66084E-09
S2B	4.53442E-13
S2C	2.62236E-18
S2D	1.79253E-24
S2BC	-1.08181E-15
S2BD	8.87884E-19
S2BN	-2.64666E-11
S2CD	-2.16549E-21
S2CN	6.11188E-14
S2DN	-4.95614E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-20

R	P, OBS., ATM.	P, CAL., ATM.	P, OBS. - P, CAL.	$\frac{P, OBS. - P, CAL.}{P, OBS.}$
0	6.8620552E&02	6.8620552E&02	0.00000E-99	0.00000E-99
1	2.9602082E&02	2.9602082E&02	2.62804E-06	8.87789E-09
2	1.3813812E&02	1.3813815E&02	-3.13665E-05	-2.27066E-07
3	6.6875363E&01	6.6875256E&01	1.06999E-04	1.59998E-06
4	3.2955262E&01	3.2955255E&01	6.33209E-06	1.92142E-07
5	1.6381782E&01	1.6382216E&01	-4.33714E-04	-2.64754E-05
6	8.1792899E-00	8.1790174E-00	2.72437E-04	3.33082E-05
7	4.0925711E-00	4.0923019E-00	2.69220E-04	6.57826E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 3.47289E-07

CONSTANTS AND STANDARD ERRORS

N	1.994313062E-00	SN	3.28161E-05
B	5.338932226E-04	SB	5.48560E-07
C	-6.414424732E-08	SC	1.33671E-09
D	1.446665089E-11	SD	1.11977E-12

VARIANCES AND COVARIANCES

S2N	1.07690E-09
S2B	3.00918E-13
S2C	1.78680E-18
S2D	1.25389E-24
S2BC	-7.27463E-16
S2BD	6.04938E-19
S2BN	-1.73612E-11
S2CD	-1.49500E-21
S2CN	4.06247E-14
S2DN	-3.33767E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-21

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	7.7435393E&02	7.7435393E&02	0.00000E-99	0.00000E-99
1	3.2882507E&02	3.2882506E&02	9.09106E-06	2.76471E-08
2	1.5234062E&02	1.5234074E&02	-1.19684E-04	-7.85637E-07
3	7.3499612E&01	7.3499100E&01	5.12534E-04	6.97329E-06
4	3.6158408E&01	3.6159025E&01	-6.17593E-04	-1.70802E-05
5	1.7959522E&01	1.7959885E&01	-3.62650E-04	-2.01926E-05
6	8.9632908E-00	8.9628967E-00	3.94142E-04	4.39730E-05
7	4.4841902E-00	4.4835196E-00	6.70613E-04	1.49550E-04

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.39510E-06

CONSTANTS AND STANDARD ERRORS

N	1.994351545E-00	SN	5.95698E-05
B	5.326044978E-04	SB	9.00479E-07
C	-6.072347342E-08	SC	1.95871E-09
D	1.147232944E-11	SD	1.46499E-12

VARIANCES AND COVARIANCES

S2N	3.54857E-09
S2B	8.10863E-13
S2C	3.83657E-18
S2D	2.14620E-24
S2BC	-1.74975E-15
S2BD	1.29932E-18
S2BN	-5.17381E-11
S2CD	-2.86616E-21
S2CN	1.08059E-13
S2DN	-7.92985E-17

TABLE 1. - EXPERIMENTAL PRESSURES, CALCULATED PRESSURES,
CONSTANTS, STANDARD ERRORS, VARIANCES,
AND COVARIANCES

RUN NO. HE-0-22

R	P,OBS.,ATM.	P,CAL.,ATM.	P,OBS.-P,CAL.	$\frac{P,OBS.-P,CAL.}{P,OBS.}$
0	5.8218590E&02	5.8218590E&02	0.000000E-99	0.000000E-99
1	2.5608357E&02	2.5608357E&02	1.00971E-06	3.94289E-09
2	1.2058177E&02	1.2058178E&02	-1.09306E-05	-9.06494E-08
3	5.8627782E&01	5.8627754E&01	2.82302E-05	4.81517E-07
4	2.8951908E&01	2.8951851E&01	5.64233E-05	1.94886E-06
5	1.4406838E&01	1.4407097E&01	-2.59446E-04	-1.80085E-05
6	7.1967975E-00	7.1966462E-00	1.51299E-04	2.10232E-05
7	3.6018337E-00	3.6017138E-00	1.19972E-04	3.33088E-05

SUM OF WEIGHTED SQUARES OF THE RESIDUALS 1.08698E-07

CONSTANTS AND STANDARD ERRORS

N	1.994313160E-00	SN	2.10668E-05
B	5.339842895E-04	SB	4.04809E-07
C	-6.528185895E-08	SC	1.15236E-09
D	1.629876851E-11	SD	1.12714E-12

VARIANCES AND COVARIANCES

S2N	4.43813E-10
S2B	1.63871E-13
S2C	1.32794E-18
S2D	1.27046E-24
S2BC	-4.62816E-16
S2BD	4.49283E-19
S2BN	-8.22373E-12
S2CD	-1.29723E-21
S2CN	2.24827E-14
S2DN	-2.15564E-17

The variances of the constants were designated as $S2N$, $S2B$, $S2C$, and $S2D$. The covariances of the constants were designated as $S2BC$, $S2BD$, $S2BN$, $S2CD$, $S2CN$, and $S2DN$. The variances and covariances of the constants are recorded in table 1.

The variances of pressures calculated at nominal increments of pressure and the covariances of BP, CP, and DP at nominal increments of pressure are recorded in table 2 under the headings $S2P$, $S2BP$, $S2CP$, and $S2DP$, respectively.

Compressibility factors and standard errors of the compressibility factors calculated at nominal increments of pressure are listed in table 3 under the headings Z and SZ , respectively.

Values of the compressibility apparatus zero pressure volume ratio (N) for each of the twenty-two runs are recorded in table 4 along with the value of the average N , the standard error in the average N , the average standard error of N , and the standard error of a single N .

Values for the constant B of equation (2) for helium at 0°C are recorded in table 5 for each of the twenty-two compressibility runs along with the average B , the standard error of the average B , the average standard error of B , and the standard error of a single B .

Values for the constant C of equation (2) for helium at 0°C are recorded in table 6 for each of the twenty-two runs along with the average C , the standard error of the average C , the average standard error of C , and standard error of a single C .

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-1

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	2.04038E-08	1.59024E-10	-3.86422E-13
2.000E-00	4.81086E-08	2.39590E-10	-5.79105E-13
5.000E-00	1.16234E-07	3.51943E-10	-8.38741E-13
1.000E&01	1.64620E-07	3.68226E-10	-8.53148E-13
2.500E&01	1.55786E-07	7.62434E-11	-8.34608E-14
5.000E&01	2.84623E-07	-4.13578E-10	1.12706E-12
7.500E&01	3.67244E-07	-5.36652E-10	1.36226E-12
1.000E&02	3.09055E-07	-3.13888E-10	7.06373E-13
1.250E&02	3.85221E-07	1.28229E-10	-4.99684E-13
1.500E&02	7.93406E-07	6.44368E-10	-1.87271E-12
2.000E&02	1.83746E-06	1.36450E-09	-3.72515E-12
2.500E&02	1.03860E-06	9.86501E-10	-2.62046E-12
3.000E&02	1.37145E-06	-9.44996E-10	2.60209E-12
3.500E&02	1.64595E-05	-4.43313E-09	1.19164E-11
4.000E&02	6.34188E-05	-9.01277E-09	2.40706E-11
4.500E&02	1.43492E-04	-1.37460E-08	3.65766E-11
5.000E&02	2.21775E-04	-1.72232E-08	4.57132E-11
6.000E&02	1.13458E-04	-1.24286E-08	3.28775E-11
7.000E&02	4.90112E-04	2.59617E-08	-6.85285E-11
8.000E&02	1.14486E-02	1.25888E-07	-3.31788E-10
9.000E&02	7.48509E-02	3.22634E-07	-8.49362E-10
1.000E&03	3.11185E-01	6.58978E-07	-1.73328E-09

PRESSURE, ATM.

S2DP

1.000E-00	3.33212E-16
2.000E-00	4.98376E-16
5.000E-00	7.18008E-16
1.000E&01	7.22503E-16
2.500E&01	4.04109E-17
5.000E&01	-1.00728E-15
7.500E&01	-1.18634E-15
1.000E&02	-5.80903E-16
1.250E&02	5.03613E-16
1.500E&02	1.72660E-15
2.000E&02	3.35305E-15
2.500E&02	2.32816E-15
3.000E&02	-2.36620E-15
3.500E&02	-1.06946E-14
4.000E&02	-2.15343E-14
4.500E&02	-3.26670E-14
5.000E&02	-4.07811E-14
6.000E&02	-2.92878E-14
7.000E&02	6.09906E-14
8.000E&02	2.95104E-13
9.000E&02	7.55097E-13
1.000E&03	1.54035E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-2

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	2.31976E-08	1.68412E-10	-3.85184E-13
2.000E-00	5.52136E-08	2.55147E-10	-5.80577E-13
5.000E-00	1.36231E-07	3.80049E-10	-8.53259E-13
1.000E&01	1.98273E-07	4.07690E-10	-8.91823E-13
2.500E&01	1.89965E-07	1.17630E-10	-1.67618E-13
5.000E&01	3.26239E-07	-4.15025E-10	1.07792E-12
7.500E&01	4.50436E-07	-5.96647E-10	1.43973E-12
1.000E&02	3.92901E-07	-4.22068E-10	9.34760E-13
1.250E&02	4.11247E-07	-1.03437E-12	-1.56284E-13
1.500E&02	7.73905E-07	5.31907E-10	-1.49853E-12
2.000E&02	2.11937E-06	1.41816E-09	-3.66819E-12
2.500E&02	1.81944E-06	1.37049E-09	-3.45554E-12
3.000E&02	6.11257E-07	-1.39807E-10	4.15946E-13
3.500E&02	9.64476E-06	-3.25374E-09	8.26431E-12
4.000E&02	4.80304E-05	-7.70698E-09	1.94086E-11
4.500E&02	1.28176E-04	-1.28242E-08	3.21564E-11
5.000E&02	2.34702E-04	-1.75191E-08	4.38042E-11
6.000E&02	2.77774E-04	-1.92547E-08	4.79676E-11
7.000E&02	1.12455E-05	3.89596E-09	-9.68307E-12
8.000E&02	4.15276E-03	7.51371E-08	-1.86441E-10
9.000E&02	3.67345E-02	2.24035E-07	-5.55234E-10
1.000E&03	1.72653E-01	4.86605E-07	-1.20483E-09

PRESSURE, ATM.

S2DP

1.000E-00	3.12723E-16
2.000E-00	4.70472E-16
5.000E-00	6.88015E-16
1.000E&01	7.12090E-16
2.500E&01	1.06776E-16
5.000E&01	-9.10254E-16
7.500E&01	-1.18505E-15
1.000E&02	-7.40607E-16
1.250E&02	1.85743E-16
1.500E&02	1.31357E-15
2.000E&02	3.11564E-15
2.500E&02	2.90265E-15
3.000E&02	-3.82171E-16
3.500E&02	-6.99450E-15
4.000E&02	-1.63560E-14
4.500E&02	-2.70444E-14
5.000E&02	-3.67937E-14
6.000E&02	-4.02269E-14
7.000E&02	8.11251E-15
8.000E&02	1.56095E-13
9.000E&02	4.64629E-13
1.000E&03	1.00783E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-3

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	3.73817E-08	2.66819E-10	-6.01302E-13
2.000E-00	8.91708E-08	4.04762E-10	-9.07547E-13
5.000E-00	2.21102E-07	6.04865E-10	-1.33835E-12
1.000E&01	3.23866E-07	6.52592E-10	-1.40757E-12
2.500E&01	3.11555E-07	2.00565E-10	-2.93713E-13
5.000E&01	5.26516E-07	-6.47670E-10	1.66298E-12
7.500E&01	7.37877E-07	-9.54050E-10	2.27351E-12
1.000E&02	6.51336E-07	-7.00742E-10	1.54098E-12
1.250E&02	6.58323E-07	-5.29089E-11	-1.17339E-13
1.500E&02	1.20159E-06	7.83395E-10	-2.19577E-12
2.000E&02	3.39956E-06	2.22436E-09	-5.67901E-12
2.500E&02	3.17243E-06	2.26972E-09	-5.64788E-12
3.000E&02	9.04549E-07	7.10787E-11	-8.17181E-14
3.500E&02	1.29149E-05	-4.63666E-09	1.16188E-11
4.000E&02	6.91868E-05	-1.15073E-08	2.85686E-11
4.500E&02	1.92362E-04	-1.95743E-08	4.83778E-11
5.000E&02	3.65419E-04	-2.72502E-08	6.71521E-11
6.000E&02	4.93173E-04	-3.19947E-08	7.85484E-11
7.000E&02	2.85672E-07	-7.74485E-10	1.89688E-12
8.000E&02	4.82712E-03	1.01046E-07	-2.47073E-10
9.000E&02	4.74855E-02	3.17741E-07	-7.75966E-10
1.000E&03	2.31814E-01	7.03379E-07	-1.71610E-09

PRESSURE, ATM.	S2DP
1.000E-00	4.81088E-16
2.000E-00	7.24759E-16
5.000E-00	1.06357E-15
1.000E&01	1.10791E-15
2.500E&01	1.90026E-16
5.000E&01	-1.38517E-15
7.500E&01	-1.84569E-15
1.000E&02	-1.20770E-15
1.250E&02	1.80903E-16
1.500E&02	1.90272E-15
2.000E&02	4.75620E-15
2.500E&02	4.67854E-15
3.000E&02	2.05786E-17
3.500E&02	-9.69623E-15
4.000E&02	-2.37290E-14
4.500E&02	-4.00979E-14
5.000E&02	-5.55860E-14
6.000E&02	-6.49140E-14
7.000E&02	-1.56605E-15
8.000E&02	2.03842E-13
9.000E&02	6.39866E-13
1.000E&03	1.41455E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-4

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	6.83331E-09	4.84341E-11	-1.08513E-13
2.000E-00	1.63150E-08	7.35130E-11	-1.63869E-13
5.000E-00	4.05351E-08	1.10000E-10	-2.41989E-13
1.000E&01	5.95305E-08	1.18953E-10	-2.55141E-13
2.500E&01	5.73727E-08	3.74543E-11	-5.53541E-14
5.000E&01	9.63143E-08	-1.16828E-10	2.98631E-13
7.500E&01	1.35770E-07	-1.73797E-10	4.12113E-13
1.000E&02	1.20458E-07	-1.29517E-10	2.83973E-13
1.250E&02	1.20153E-07	-1.33400E-11	-1.19950E-14
1.500E&02	2.16429E-07	1.37845E-10	-3.85758E-13
2.000E&02	6.19899E-07	4.01960E-10	-1.02098E-12
2.500E&02	5.97316E-07	4.18767E-10	-1.03658E-12
3.000E&02	1.64061E-07	3.35034E-11	-6.59586E-14
3.500E&02	2.18595E-06	-8.04894E-10	2.00629E-12
4.000E&02	1.20793E-05	-2.03866E-09	5.03279E-12
4.500E&02	3.41554E-05	-3.49955E-09	8.59970E-12
5.000E&02	6.58367E-05	-4.90860E-09	1.20266E-11
6.000E&02	9.32796E-05	-5.90596E-09	1.44155E-11
7.000E&02	9.98040E-07	-6.14468E-10	1.49623E-12
8.000E&02	7.67254E-04	1.71004E-08	-4.15700E-11
9.000E&02	7.91826E-03	5.50781E-08	-1.33724E-10
1.000E&03	3.92602E-02	1.22877E-07	-2.98049E-10

PRESSURE, ATM.

S2DP

1.000E-00	8.63103E-17
2.000E-00	1.30098E-16
5.000E-00	1.91187E-16
1.000E&01	1.99671E-16
2.500E&01	3.59705E-17
5.000E&01	-2.47377E-16
7.500E&01	-3.32712E-16
1.000E&02	-2.21560E-16
1.250E&02	2.48956E-17
1.500E&02	3.32771E-16
2.000E&02	8.50266E-16
2.500E&02	8.53870E-16
3.000E&02	4.60771E-17
3.500E&02	-1.66490E-15
4.000E&02	-4.15596E-15
4.500E&02	-7.08620E-15
5.000E&02	-9.89684E-15
6.000E&02	-1.18432E-14
7.000E&02	-1.22801E-15
8.000E&02	3.40944E-14
9.000E&02	1.09620E-13
1.000E&03	2.44229E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-5

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	3.60084E-08	2.58378E-10	-5.85012E-13
2.000E-00	8.58359E-08	3.91799E-10	-8.82591E-13
5.000E-00	2.12508E-07	5.84903E-10	-1.30017E-12
1.000E&01	3.10657E-07	6.29931E-10	-1.36478E-12
2.500E&01	2.98460E-07	1.89918E-10	-2.76011E-13
5.000E&01	5.06949E-07	-6.30215E-10	1.62403E-12
7.500E&01	7.07193E-07	-9.21303E-10	2.20422E-12
1.000E&02	6.21861E-07	-6.68965E-10	1.47459E-12
1.250E&02	6.35222E-07	-3.57548E-11	-1.52575E-13
1.500E&02	1.17096E-06	7.76646E-10	-2.18012E-12
2.000E&02	3.28045E-06	2.16128E-09	-5.54071E-12
2.500E&02	2.98416E-06	2.16909E-09	-5.42011E-12
3.000E&02	8.86113E-07	-1.85770E-11	1.39992E-13
3.500E&02	1.32024E-05	-4.64638E-09	1.16928E-11
4.000E&02	6.90913E-05	-1.13578E-08	2.83249E-11
4.500E&02	1.89642E-04	-1.91866E-08	4.76367E-11
5.000E&02	3.56211E-04	-2.65558E-08	6.57423E-11
6.000E&02	4.62411E-04	-3.05753E-08	7.54115E-11
7.000E&02	7.82337E-07	1.26483E-09	-3.11224E-12
8.000E&02	5.16700E-03	1.03167E-07	-2.53434E-10
9.000E&02	4.90992E-02	3.18836E-07	-7.82272E-10
1.000E&03	2.36887E-01	7.01653E-07	-1.71988E-09

PRESSURE, ATM. S2DP

1.000E-00	4.70210E-16
2.000E-00	7.08069E-16
5.000E-00	1.03796E-15
1.000E&01	1.07907E-15
2.500E&01	1.77866E-16
5.000E&01	-1.35855E-15
7.500E&01	-1.79720E-15
1.000E&02	-1.15969E-15
1.250E&02	2.08752E-16
1.500E&02	1.89589E-15
2.000E&02	4.66085E-15
2.500E&02	4.50955E-15
3.000E&02	-1.63439E-16
3.500E&02	-9.80095E-15
4.000E&02	-2.36335E-14
4.500E&02	-3.96644E-14
5.000E&02	-5.46690E-14
6.000E&02	-6.26085E-14
7.000E&02	2.58129E-15
8.000E&02	2.10053E-13
9.000E&02	6.48043E-13
1.000E&03	1.42421E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-6

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	4.35959E-08	3.10290E-10	-6.97764E-13
2.000E-00	1.04032E-07	4.70807E-10	-1.05336E-12
5.000E-00	2.58158E-07	7.03927E-10	-1.55423E-12
1.000E&01	3.78535E-07	7.60158E-10	-1.63623E-12
2.500E&01	3.64403E-07	2.35854E-10	-3.46728E-13
5.000E&01	6.14228E-07	-7.51393E-10	1.92615E-12
7.500E&01	8.62768E-07	-1.11107E-09	2.64289E-12
1.000E&02	7.63050E-07	-8.20665E-10	1.80283E-12
1.250E&02	7.67286E-07	-7.06691E-11	-1.13622E-13
1.500E&02	1.39363E-06	9.00548E-10	-2.52267E-12
2.000E&02	3.96246E-06	2.58302E-09	-6.58219E-12
2.500E&02	3.74389E-06	2.65696E-09	-6.59871E-12
3.000E&02	1.04997E-06	1.33154E-10	-2.20809E-13
3.500E&02	1.46406E-05	-5.30447E-09	1.32661E-11
4.000E&02	7.93634E-05	-1.32658E-08	3.28654E-11
4.500E&02	2.22079E-04	-2.26437E-08	5.58450E-11
5.000E&02	4.24215E-04	-3.16131E-08	7.77371E-11
6.000E&02	5.83250E-04	-3.74653E-08	9.17815E-11
7.000E&02	1.77564E-06	-2.07917E-09	5.08137E-12
8.000E&02	5.33177E-03	1.14354E-07	-2.79008E-10
9.000E&02	5.33079E-02	3.62519E-07	-8.83405E-10
1.000E&03	2.61155E-01	8.03920E-07	-1.95715E-09

PRESSURE, ATM.

S2DP

1.000E-00	5.57025E-16
2.000E-00	8.39343E-16
5.000E-00	1.23241E-15
1.000E&01	1.28509E-15
2.500E&01	2.24756E-16
5.000E&01	-1.60103E-15
7.500E&01	-2.14107E-15
1.000E&02	-1.41055E-15
1.250E&02	1.90826E-16
1.500E&02	2.18223E-15
2.000E&02	5.50082E-15
2.500E&02	5.45456E-15
3.000E&02	1.28481E-16
3.500E&02	-1.10472E-14
4.000E&02	-2.72376E-14
4.500E&02	-4.61841E-14
5.000E&02	-6.42044E-14
6.000E&02	-7.56805E-14
7.000E&02	-4.18576E-15
8.000E&02	2.29673E-13
9.000E&02	7.26829E-13
1.000E&03	1.60963E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-7

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	6.13797E-09	4.37448E-11	-9.84927E-14
2.000E-00	1.46444E-08	6.63676E-11	-1.48672E-13
5.000E-00	3.63266E-08	9.92040E-11	-2.19305E-13
1.000E&01	5.32393E-08	1.07079E-10	-2.30762E-13
2.500E&01	5.12376E-08	3.30638E-11	-4.85199E-14
5.000E&01	8.64767E-08	-1.06066E-10	2.72158E-13
7.500E&01	1.21326E-07	-1.56535E-10	3.72745E-13
1.000E&02	1.07198E-07	-1.15293E-10	2.53446E-13
1.250E&02	1.08073E-07	-9.30759E-12	-1.76571E-14
1.500E&02	1.96788E-07	1.27723E-10	-3.57937E-13
2.000E&02	5.58121E-07	3.64459E-10	-9.29755E-13
2.500E&02	5.23978E-07	3.73345E-10	-9.28258E-13
3.000E&02	1.48177E-07	1.50539E-11	-2.18786E-14
3.500E&02	2.09297E-06	-7.54453E-10	1.88897E-12
4.000E&02	1.12762E-05	-1.87927E-09	4.66139E-12
4.500E&02	3.14492E-05	-3.20203E-09	7.90661E-12
5.000E&02	5.99011E-05	-4.46377E-09	1.09898E-11
6.000E&02	8.15562E-05	-5.26415E-09	1.29117E-11
7.000E&02	1.23144E-07	-2.05737E-10	5.03428E-13
8.000E&02	7.72547E-04	1.63556E-08	-3.99548E-11
9.000E&02	7.65310E-03	5.16109E-08	-1.25923E-10
1.000E&03	3.73902E-02	1.14295E-07	-2.78597E-10

PRESSURE, ATM.

S2DP

1.000E-00	7.87208E-17
2.000E-00	1.18606E-16
5.000E-00	1.74102E-16
1.000E&01	1.81451E-16
2.500E&01	3.14237E-17
5.000E&01	-2.26474E-16
7.500E&01	-3.02311E-16
1.000E&02	-1.98480E-16
1.250E&02	2.83079E-17
1.500E&02	3.09922E-16
2.000E&02	7.77903E-16
2.500E&02	7.68186E-16
3.000E&02	1.04309E-17
3.500E&02	-1.57483E-15
4.000E&02	-3.86777E-15
4.500E&02	-6.54661E-15
5.000E&02	-9.08760E-15
6.000E&02	-1.06594E-14
7.000E&02	-4.15195E-16
8.000E&02	3.29294E-14
9.000E&02	1.03729E-13
1.000E&03	2.29404E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-8

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	8.02585E-09	5.73388E-11	-1.29351E-13
2.000E-00	1.91426E-08	8.69762E-11	-1.95215E-13
5.000E-00	4.74521E-08	1.29950E-10	-2.87826E-13
1.000E&01	6.94823E-08	1.40157E-10	-3.02605E-13
2.500E&01	6.68285E-08	4.29210E-11	-6.27785E-14
5.000E&01	1.13042E-07	-1.39314E-10	3.58002E-13
7.500E&01	1.58281E-07	-2.04921E-10	4.88766E-13
1.000E&02	1.39615E-07	-1.50187E-10	3.30470E-13
1.250E&02	1.41395E-07	-1.07166E-11	-2.68566E-14
1.500E&02	2.58567E-07	1.69118E-10	-4.74210E-13
2.000E&02	7.30153E-07	4.78334E-10	-1.22234E-12
2.500E&02	6.77990E-07	4.86516E-10	-1.21174E-12
3.000E&02	1.94747E-07	1.14142E-11	-7.91738E-15
3.500E&02	2.80704E-06	-1.00348E-09	2.51694E-12
4.000E&02	1.49680E-05	-2.48289E-09	6.17024E-12
4.500E&02	4.15124E-05	-4.21780E-09	1.04346E-11
5.000E&02	7.86889E-05	-5.86525E-09	1.44681E-11
6.000E&02	1.05413E-04	-6.86075E-09	1.68604E-11
7.000E&02	1.40560E-08	-7.96803E-11	1.95352E-13
8.000E&02	1.05920E-03	2.19536E-08	-5.37342E-11
9.000E&02	1.03470E-02	6.87922E-08	-1.68170E-10
1.000E&03	5.03889E-02	1.52097E-07	-3.71464E-10

PRESSURE, ATM.	S2DP
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1.000E-00	1.03588E-16
2.000E-00	1.56044E-16
5.000E-00	2.28948E-16
1.000E&01	2.38403E-16
2.500E&01	4.05924E-17
5.000E&01	-2.98458E-16
7.500E&01	-3.97145E-16
1.000E&02	-2.59187E-16
1.250E&02	4.02883E-17
1.500E&02	4.11223E-16
2.000E&02	1.02464E-15
2.500E&02	1.00467E-15
3.000E&02	-3.61921E-18
3.500E&02	-2.10233E-15
4.000E&02	-5.12973E-15
4.500E&02	-8.65684E-15
5.000E&02	-1.19873E-14
6.000E&02	-1.39468E-14
7.000E&02	-1.61433E-16
8.000E&02	4.43737E-14
9.000E&02	1.38804E-13
1.000E&03	3.06480E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-9

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	7.23655E-08	5.29969E-10	-1.22210E-12
2.000E-00	1.72040E-07	8.02357E-10	-1.84072E-12
5.000E-00	4.23383E-07	1.19306E-09	-2.70034E-12
1.000E&01	6.14111E-07	1.27586E-09	-2.81290E-12
2.500E&01	5.87248E-07	3.55050E-10	-4.96934E-13
5.000E&01	1.01707E-06	-1.31649E-09	3.44137E-12
7.500E&01	1.39274E-06	-1.86793E-09	4.53887E-12
1.000E&02	1.20752E-06	-1.29334E-09	2.87491E-12
1.250E&02	1.28971E-06	5.24998E-11	-6.36658E-13
1.500E&02	2.46502E-06	1.73840E-09	-4.91429E-12
2.000E&02	6.62775E-06	4.48690E-09	-1.16901E-11
2.500E&02	5.42580E-06	4.20269E-09	-1.06739E-11
3.000E&02	2.07048E-06	-7.67873E-10	2.15728E-12
3.500E&02	3.31828E-05	-1.08224E-08	2.76961E-11
4.000E&02	1.59213E-04	-2.50452E-08	6.35715E-11
4.500E&02	4.15670E-04	-4.11887E-08	1.04107E-10
5.000E&02	7.45554E-04	-5.56739E-08	1.40328E-10
6.000E&02	8.14359E-04	-5.87715E-08	1.47600E-10
7.000E&02	9.64367E-05	2.03364E-08	-5.09557E-11
8.000E&02	1.52138E-02	2.56338E-07	-6.41252E-10
9.000E&02	1.27176E-01	7.42978E-07	-1.85638E-09
1.000E&03	5.81758E-01	1.59201E-06	-3.97403E-09

PRESSURE, ATM.

S2DP

1.000E-00	1.00012E-15
2.000E-00	1.50353E-15
5.000E-00	2.19467E-15
1.000E&01	2.26356E-15
2.500E&01	3.12799E-16
5.000E&01	-2.92786E-15
7.500E&01	-3.76404E-15
1.000E&02	-2.29083E-15
1.250E&02	7.13257E-16
1.500E&02	4.33533E-15
2.000E&02	1.00053E-14
2.500E&02	9.03391E-15
3.000E&02	-1.93516E-15
3.500E&02	-2.36209E-14
4.000E&02	-5.39958E-14
4.500E&02	-8.82528E-14
5.000E&02	-1.18808E-13
6.000E&02	-1.24770E-13
7.000E&02	4.30322E-14
8.000E&02	5.41174E-13
9.000E&02	1.56589E-12
1.000E&03	3.35087E-12

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-10

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.70679E-08	1.20666E-10	-2.69828E-13
2.000E-00	4.07643E-08	1.83182E-10	-4.07555E-13
5.000E-00	1.01353E-07	2.74229E-10	-6.02140E-13
1.000E&01	1.48989E-07	2.96788E-10	-6.35426E-13
2.500E&01	1.43691E-07	9.42272E-11	-1.39696E-13
5.000E&01	2.40654E-07	-2.90426E-10	7.41306E-13
7.500E&01	3.39928E-07	-4.33543E-10	1.02637E-12
1.000E&02	3.02137E-07	-3.24701E-10	7.11260E-13
1.250E&02	3.00012E-07	-3.64784E-11	-2.18637E-14
1.500E&02	5.37876E-07	3.39664E-10	-9.50171E-13
2.000E&02	1.54715E-06	9.99918E-10	-2.53554E-12
2.500E&02	1.50725E-06	1.04915E-09	-2.59255E-12
3.000E&02	4.10133E-07	1.01040E-10	-2.07621E-13
3.500E&02	5.31587E-06	-1.97424E-09	4.91252E-12
4.000E&02	2.97010E-05	-5.03709E-09	1.24118E-11
4.500E&02	8.44784E-05	-8.67414E-09	2.12754E-11
5.000E&02	1.63649E-04	-1.21978E-08	2.98295E-11
6.000E&02	2.35594E-04	-1.47947E-08	3.60427E-11
7.000E&02	3.93094E-06	-1.92225E-09	4.67174E-12
8.000E&02	1.82364E-03	4.15576E-08	-1.00830E-10
9.000E&02	1.91298E-02	1.34947E-07	-3.27011E-10
1.000E&03	9.52484E-02	3.01698E-07	-7.30384E-10

PRESSURE, ATM.

S2DP

1.000E-00	2.14188E-16
2.000E-00	3.22918E-16
5.000E-00	4.74785E-16
1.000E&01	4.96305E-16
2.500E&01	9.09029E-17
5.000E&01	-6.12928E-16
7.500E&01	-8.27066E-16
1.000E&02	-5.54089E-16
1.250E&02	5.52377E-17
1.500E&02	8.18418E-16
2.000E&02	2.10751E-15
2.500E&02	2.13147E-15
3.000E&02	1.50368E-16
3.500E&02	-4.06880E-15
4.000E&02	-1.02290E-14
4.500E&02	-1.74960E-14
5.000E&02	-2.44978E-14
6.000E&02	-2.95519E-14
7.000E&02	-3.82655E-15
8.000E&02	8.25309E-14
9.000E&02	2.67527E-13
1.000E&03	5.97290E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-11

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	7.21392E-09	5.13113E-11	-1.15326E-13
2.000E-00	1.72159E-08	7.78591E-11	-1.74109E-13
5.000E-00	4.27300E-08	1.16425E-10	-2.56930E-13
1.000E&01	6.26710E-08	1.25752E-10	-2.70548E-13
2.500E&01	6.03455E-08	3.91055E-11	-5.75395E-14
5.000E&01	1.01653E-07	-1.24182E-10	3.18211E-13
7.500E&01	1.42863E-07	-1.83798E-10	4.37013E-13
1.000E&02	1.26414E-07	-1.35951E-10	2.98590E-13
1.250E&02	1.26950E-07	-1.20803E-11	-1.78063E-14
1.500E&02	2.30266E-07	1.48450E-10	-4.15810E-13
2.000E&02	6.55412E-07	4.26905E-10	-1.08737E-12
2.500E&02	6.21157E-07	4.40002E-10	-1.09226E-12
3.000E&02	1.73605E-07	2.41215E-11	-4.17364E-14
3.500E&02	2.40421E-06	-8.73284E-10	2.18303E-12
4.000E&02	1.30710E-05	-2.18824E-09	5.41861E-12
4.500E&02	3.66362E-05	-3.73849E-09	9.21544E-12
5.000E&02	7.00843E-05	-5.22327E-09	1.28376E-11
6.000E&02	9.68263E-05	-6.20533E-09	1.51939E-11
7.000E&02	3.79551E-07	-3.90766E-10	9.54522E-13
8.000E&02	8.72059E-04	1.88000E-08	-4.58463E-11
9.000E&02	8.76710E-03	5.97634E-08	-1.45559E-10
1.000E&03	4.30728E-02	1.32720E-07	-3.22944E-10

PRESSURE, ATM.	S2DP
1.000E-00	9.20147E-17
2.000E-00	1.38657E-16
5.000E-00	2.03619E-16
1.000E&01	2.12373E-16
2.500E&01	3.73135E-17
5.000E&01	-2.64364E-16
7.500E&01	-3.53852E-16
1.000E&02	-2.33523E-16
1.250E&02	3.07183E-17
1.500E&02	3.59549E-16
2.000E&02	9.08261E-16
2.500E&02	9.02410E-16
3.000E&02	2.55743E-17
3.500E&02	-1.81695E-15
4.000E&02	-4.48833E-15
4.500E&02	-7.61708E-15
5.000E&02	-1.05970E-14
6.000E&02	-1.25216E-14
7.000E&02	-7.85854E-16
8.000E&02	3.77189E-14
9.000E&02	1.19695E-13
1.000E&03	2.65455E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-12

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.48367E-08	1.06234E-10	-2.40173E-13
2.000E-00	3.53769E-08	1.61116E-10	-3.62400E-13
5.000E-00	8.76368E-08	2.40615E-10	-5.34075E-13
1.000E&01	1.28211E-07	2.59309E-10	-5.61017E-13
2.500E&01	1.23247E-07	7.87279E-11	-1.14766E-13
5.000E&01	2.08951E-07	-2.58695E-10	6.65899E-13
7.500E&01	2.91972E-07	-3.79226E-10	9.06175E-13
1.000E&02	2.57092E-07	-2.76504E-10	6.09097E-13
1.250E&02	2.61611E-07	-1.69692E-11	-5.70257E-14
1.500E&02	4.80606E-07	3.16766E-10	-8.88835E-13
2.000E&02	1.35144E-06	8.87851E-10	-2.27313E-12
2.500E&02	1.24071E-06	8.96381E-10	-2.23689E-12
3.000E&02	3.62657E-07	5.02009E-12	2.57373E-14
3.500E&02	5.33294E-06	-1.88879E-09	4.74676E-12
4.000E&02	2.81401E-05	-4.64153E-09	1.15585E-11
4.500E&02	7.75884E-05	-7.85986E-09	1.94858E-11
5.000E&02	1.46302E-04	-1.09003E-08	2.69453E-11
6.000E&02	1.92448E-04	-1.26339E-08	3.11142E-11
7.000E&02	6.33731E-08	2.30579E-10	-5.66517E-13
8.000E&02	2.04941E-03	4.16172E-08	-1.02081E-10
9.000E&02	1.96602E-02	1.29230E-07	-3.16593E-10
1.000E&03	9.49411E-02	2.84524E-07	-6.96374E-10

PRESSURE, ATM.

S2DP

1.000E-00	1.92739E-16
2.000E-00	2.90285E-16
5.000E-00	4.25703E-16
1.000E&01	4.42890E-16
2.500E&01	7.40753E-17
5.000E&01	-5.56229E-16
7.500E&01	-7.37758E-16
1.000E&02	-4.78467E-16
1.250E&02	8.09113E-17
1.500E&02	7.72018E-16
2.000E&02	1.90928E-15
2.500E&02	1.85832E-15
3.000E&02	-4.04973E-17
3.500E&02	-3.97274E-15
4.000E&02	-9.62919E-15
4.500E&02	-1.61993E-14
5.000E&02	-2.23716E-14
6.000E&02	-2.57911E-14
7.000E&02	4.69128E-16
8.000E&02	8.44746E-14
9.000E&02	2.61855E-13
1.000E&03	5.75750E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-13

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	9.74840E-07	6.83429E-09	-1.52109E-11
2.000E-00	2.33057E-06	1.03808E-08	-2.29881E-11
5.000E-00	5.80684E-06	1.55609E-08	-3.40106E-11
1.000E&01	8.55839E-06	1.68784E-08	-3.59765E-11
2.500E&01	8.26702E-06	5.47461E-09	-8.18074E-12
5.000E&01	1.37573E-05	-1.63645E-08	4.16248E-11
7.500E&01	1.95372E-05	-2.46461E-08	5.81166E-11
1.000E&02	1.74411E-05	-1.86773E-08	4.08111E-11
1.250E&02	1.71388E-05	-2.48456E-09	-2.20686E-13
1.500E&02	3.04438E-05	1.88120E-08	-5.25593E-11
2.000E&02	8.87627E-05	5.66773E-08	-1.43116E-10
2.500E&02	8.89127E-05	6.05278E-08	-1.48932E-10
3.000E&02	2.36635E-05	8.15806E-09	-1.77213E-11
3.500E&02	2.86996E-04	-1.08265E-07	2.68207E-10
4.000E&02	1.65029E-03	-2.81325E-07	6.89957E-10
4.500E&02	4.75940E-03	-4.88027E-07	1.19132E-09
5.000E&02	9.31337E-03	-6.89828E-07	1.67889E-09
6.000E&02	1.38078E-02	-8.49127E-07	2.05869E-09
7.000E&02	4.87035E-04	-1.60411E-07	3.87975E-10
8.000E&02	8.84278E-02	2.16954E-06	-5.23847E-09
9.000E&02	9.34651E-01	7.07180E-06	-1.70537E-08
1.000E&03	4.49675E-00	1.55414E-05	-3.74419E-08

PRESSURE, ATM.

S2DP

1.000E-00	1.20146E-14
2.000E-00	1.81241E-14
5.000E-00	2.66853E-14
1.000E&01	2.79635E-14
2.500E&01	5.34050E-15
5.000E&01	-3.42582E-14
7.500E&01	-4.66122E-14
1.000E&02	-3.16691E-14
1.250E&02	2.27541E-15
1.500E&02	4.50987E-14
2.000E&02	1.18389E-13
2.500E&02	1.21865E-13
3.000E&02	1.33812E-14
3.500E&02	-2.21076E-13
4.000E&02	-5.65802E-13
4.500E&02	-9.74811E-13
5.000E&02	-1.37192E-12
6.000E&02	-1.67949E-12
7.000E&02	-3.16191E-13
8.000E&02	4.26625E-12
9.000E&02	1.38815E-11
1.000E&03	3.04652E-11

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-14

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.47460E-08	1.05678E-10	-2.39071E-13
2.000E-00	3.51567E-08	1.60262E-10	-3.60713E-13
5.000E-00	8.70697E-08	2.39303E-10	-5.31501E-13
1.000E&01	1.27341E-07	2.57824E-10	-5.58147E-13
2.500E&01	1.22382E-07	7.80499E-11	-1.13638E-13
5.000E&01	2.07644E-07	-2.57515E-10	6.63189E-13
7.500E&01	2.89943E-07	-3.77063E-10	9.01494E-13
1.000E&02	2.55160E-07	-2.74450E-10	6.04752E-13
1.250E&02	2.60061E-07	-1.59354E-11	-5.91038E-14
1.500E&02	4.78441E-07	3.16172E-10	-8.87336E-13
2.000E&02	1.34324E-06	8.83518E-10	-2.26333E-12
2.500E&02	1.22842E-06	8.89772E-10	-2.22168E-12
3.000E&02	3.61421E-07	-3.21514E-13	3.89553E-14
3.500E&02	5.34492E-06	-1.88795E-09	4.74745E-12
4.000E&02	2.81042E-05	-4.62903E-09	1.15347E-11
4.500E&02	7.73396E-05	-7.83058E-09	1.94256E-11
5.000E&02	1.45588E-04	-1.08504E-08	2.68390E-11
6.000E&02	1.90406E-04	-1.25395E-08	3.09018E-11
7.000E&02	1.50884E-07	3.55015E-10	-8.72812E-13
8.000E&02	2.07057E-03	4.17405E-08	-1.02450E-10
9.000E&02	1.97774E-02	1.29332E-07	-3.17051E-10
1.000E&03	9.54495E-02	2.84663E-07	-6.97170E-10

PRESSURE, ATM.

S2DP

1.000E-00	1.91984E-16
2.000E-00	2.89128E-16
5.000E-00	4.23936E-16
1.000E&01	4.40916E-16
2.500E&01	7.33002E-17
5.000E&01	-5.54316E-16
7.500E&01	-7.34414E-16
1.000E&02	-4.75293E-16
1.250E&02	8.25380E-17
1.500E&02	7.71124E-16
2.000E&02	1.90228E-15
2.500E&02	1.84688E-15
3.000E&02	-5.14818E-17
3.500E&02	-3.97591E-15
4.000E&02	-9.61575E-15
4.500E&02	-1.61602E-14
5.000E&02	-2.22984E-14
6.000E&02	-2.56324E-14
7.000E&02	7.23260E-16
8.000E&02	8.48377E-14
9.000E&02	2.62413E-13
1.000E&03	5.76801E-13

TABLE 2.- VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-15

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.35168E-08	9.55705E-11	-2.13709E-13
2.000E-00	3.22827E-08	1.45083E-10	-3.22790E-13
5.000E-00	8.02634E-08	2.17191E-10	-4.76898E-13
1.000E&01	1.17982E-07	2.35054E-10	-5.03251E-13
2.500E&01	1.13779E-07	7.46140E-11	-1.10608E-13
5.000E&01	1.90569E-07	-2.30029E-10	5.87137E-13
7.500E&01	2.69173E-07	-3.43355E-10	8.12859E-13
1.000E&02	2.39235E-07	-2.57122E-10	5.63213E-13
1.250E&02	2.37578E-07	-2.88223E-11	-1.74834E-14
1.500E&02	4.26005E-07	2.69097E-10	-7.52734E-13
2.000E&02	1.22528E-06	7.91989E-10	-2.00826E-12
2.500E&02	1.19343E-06	8.30869E-10	-2.05313E-12
3.000E&02	3.24759E-07	7.97816E-11	-1.63835E-13
3.500E&02	4.21157E-06	-1.56402E-09	3.89173E-12
4.000E&02	2.35262E-05	-3.98988E-09	9.83137E-12
4.500E&02	6.69073E-05	-6.87034E-09	1.68511E-11
5.000E&02	1.29597E-04	-9.66081E-09	2.36250E-11
6.000E&02	1.86520E-04	-1.17158E-08	2.85419E-11
7.000E&02	3.09474E-06	-1.51796E-09	3.68915E-12
8.000E&02	1.44491E-03	3.29221E-08	-7.98776E-11
9.000E&02	1.51531E-02	1.06892E-07	-2.59026E-10
1.000E&03	7.54434E-02	2.38968E-07	-5.78519E-10

PRESSURE, ATM.

S2DP

1.000E-00	1.69645E-16
2.000E-00	2.55762E-16
5.000E-00	3.76040E-16
1.000E&01	3.93076E-16
2.500E&01	7.19721E-17
5.000E&01	-4.85466E-16
7.500E&01	-6.55021E-16
1.000E&02	-4.38761E-16
1.250E&02	4.38865E-17
1.500E&02	6.48363E-16
2.000E&02	1.66928E-15
2.500E&02	1.68801E-15
3.000E&02	1.18599E-16
3.500E&02	-3.22339E-15
4.000E&02	-8.10258E-15
4.500E&02	-1.38579E-14
5.000E&02	-1.94028E-14
6.000E&02	-2.34024E-14
7.000E&02	-3.02179E-15
8.000E&02	6.53825E-14
9.000E&02	2.11913E-13
1.000E&03	4.73109E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-16

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	8.06000E-10	5.71154E-12	-1.27979E-14
2.000E-00	1.92443E-09	8.66905E-12	-1.93267E-14
5.000E-00	4.78156E-09	1.29720E-11	-2.85409E-14
1.000E&01	7.02271E-09	1.40283E-11	-3.00933E-14
2.500E&01	6.76875E-09	4.41800E-12	-6.53138E-15
5.000E&01	1.13620E-08	-1.37771E-11	3.52209E-14
7.500E&01	1.60174E-08	-2.04973E-11	4.86099E-14
1.000E&02	1.42114E-08	-1.52767E-11	3.34999E-14
1.250E&02	1.41737E-08	-1.57581E-12	-1.40790E-15
1.500E&02	2.55305E-08	1.62555E-11	-4.54958E-14
2.000E&02	7.31420E-08	4.74109E-11	-1.20437E-13
2.500E&02	7.04934E-08	4.94000E-11	-1.22295E-13
3.000E&02	1.93538E-08	3.95917E-12	-7.79974E-15
3.500E&02	2.57951E-07	-9.49444E-11	2.36684E-13
4.000E&02	1.42573E-06	-2.40501E-10	5.93780E-13
4.500E&02	4.03178E-06	-4.12858E-10	1.01465E-12
5.000E&02	7.77165E-06	-5.79094E-10	1.41899E-12
6.000E&02	1.10095E-05	-6.96705E-10	1.70072E-12
7.000E&02	1.18009E-07	-7.25522E-11	1.76683E-13
8.000E&02	9.03909E-05	2.01542E-09	-4.89988E-12
9.000E&02	9.31547E-04	6.48684E-09	-1.57511E-11
1.000E&03	4.60937E-03	1.44572E-08	-3.50706E-11

PRESSURE, ATM.

S2DP

1.000E-00	1.01794E-17
2.000E-00	1.53440E-17
5.000E-00	2.25495E-17
1.000E&01	2.35511E-17
2.500E&01	4.24477E-18
5.000E&01	-2.91764E-17
7.500E&01	-3.92450E-17
1.000E&02	-2.61379E-17
1.250E&02	2.93060E-18
1.500E&02	3.92470E-17
2.000E&02	1.00299E-16
2.500E&02	1.00739E-16
3.000E&02	5.45152E-18
3.500E&02	-1.96411E-16
4.000E&02	-4.90334E-16
4.500E&02	-8.36086E-16
5.000E&02	-1.16771E-15
6.000E&02	-1.39726E-15
7.000E&02	-1.45011E-16
8.000E&02	4.01876E-15
9.000E&02	1.29120E-14
1.000E&03	2.87381E-14

TABLE 2.- VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-17

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	5.52921E-10	3.95873E-12	-8.94929E-15
2.000E-00	1.31840E-09	6.00389E-12	-1.35037E-14
5.000E-00	3.26607E-09	8.96649E-12	-1.99009E-14
1.000E&01	4.77839E-09	9.66330E-12	-2.09052E-14
2.500E&01	4.59363E-09	2.93435E-12	-4.27766E-15
5.000E&01	7.78761E-09	-9.63989E-12	2.48125E-14
7.500E&01	1.08822E-08	-1.41325E-11	3.37683E-14
1.000E&02	9.58269E-09	-1.03058E-11	2.27015E-14
1.250E&02	9.74985E-09	-6.35323E-13	-2.11762E-15
1.500E&02	1.79094E-08	1.18010E-11	-3.31125E-14
2.000E&02	5.03681E-08	3.30854E-11	-8.47028E-14
2.500E&02	4.62584E-08	3.34114E-11	-8.33727E-14
3.000E&02	1.35120E-08	2.07071E-13	9.08880E-16
3.500E&02	1.98586E-07	-7.03528E-11	1.76794E-13
4.000E&02	1.04825E-06	-1.72924E-10	4.30600E-13
4.500E&02	2.89084E-06	-2.92858E-10	7.25997E-13
5.000E&02	5.45204E-06	-4.06185E-10	1.00401E-12
6.000E&02	7.17638E-06	-4.70939E-10	1.15973E-12
7.000E&02	2.07496E-09	8.05384E-12	-1.97864E-14
8.000E&02	7.62423E-05	1.54948E-09	-3.80042E-12
9.000E&02	7.31802E-04	4.81278E-09	-1.17898E-11
1.000E&03	3.53444E-03	1.05970E-08	-2.59346E-11

PRESSURE, ATM.

S2DP

1.000E-00	7.18128E-18
2.000E-00	1.08157E-17
5.000E-00	1.58615E-17
1.000E&01	1.65022E-17
2.500E&01	2.76096E-18
5.000E&01	-2.07246E-17
7.500E&01	-2.74904E-17
1.000E&02	-1.78318E-17
1.250E&02	3.00869E-18
1.500E&02	2.87589E-17
2.000E&02	7.11398E-17
2.500E&02	6.92580E-17
3.000E&02	-1.46703E-18
3.500E&02	-1.47955E-16
4.000E&02	-3.58696E-16
4.500E&02	-6.03506E-16
5.000E&02	-8.33530E-16
6.000E&02	-9.61254E-16
7.000E&02	1.63838E-17
8.000E&02	3.14471E-15
9.000E&02	9.75071E-15
1.000E&03	2.14407E-14

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-18

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	2.00584E-08	1.42291E-10	-3.19171E-13
2.000E-00	4.78856E-08	2.15953E-10	-4.81953E-13
5.000E-00	1.18941E-07	3.23076E-10	-7.11566E-13
1.000E&01	1.74619E-07	3.49249E-10	-7.49956E-13
2.500E&01	1.68266E-07	1.09545E-10	-1.61713E-13
5.000E&01	2.82767E-07	-3.43623E-10	8.79187E-13
7.500E&01	3.98231E-07	-5.10387E-10	1.21149E-12
1.000E&02	3.53024E-07	-3.79476E-10	8.32624E-13
1.250E&02	3.52863E-07	-3.74027E-11	-3.96903E-14
1.500E&02	6.37063E-07	4.07203E-10	-1.14003E-12
2.000E&02	1.82154E-06	1.18227E-09	-3.00612E-12
2.500E&02	1.74626E-06	1.22763E-09	-3.04204E-12
3.000E&02	4.81849E-07	8.84327E-11	-1.69121E-13
3.500E&02	6.50790E-06	-2.38431E-09	5.94946E-12
4.000E&02	3.57806E-05	-6.01844E-09	1.48741E-11
4.500E&02	1.00892E-04	-1.03154E-08	2.53778E-11
5.000E&02	1.93992E-04	-1.44502E-08	3.54452E-11
6.000E&02	2.72533E-04	-1.73122E-08	4.23050E-11
7.000E&02	2.22635E-06	-1.57384E-09	3.83674E-12
8.000E&02	2.30265E-03	5.08032E-08	-1.23641E-10
9.000E&02	2.35060E-02	1.62738E-07	-3.95570E-10
1.000E&03	1.15826E-01	3.61938E-07	-8.78923E-10

PRESSURE, ATM.

S2DP

1.000E-00	2.54126E-16
2.000E-00	3.83024E-16
5.000E-00	5.62759E-16
1.000E&01	5.87501E-16
2.500E&01	1.05026E-16
5.000E&01	-7.28997E-16
7.500E&01	-9.79035E-16
1.000E&02	-6.50155E-16
1.250E&02	7.69395E-17
1.500E&02	9.84213E-16
2.000E&02	2.50593E-15
2.500E&02	2.50828E-15
3.000E&02	1.15050E-16
3.500E&02	-4.94192E-15
4.000E&02	-1.22951E-14
4.500E&02	-2.09327E-14
5.000E&02	-2.91980E-14
6.000E&02	-3.47918E-14
7.000E&02	-3.15218E-15
8.000E&02	1.01510E-13
9.000E&02	3.24601E-13
1.000E&03	7.20953E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-19

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	7.37937E-09	5.31101E-11	-1.20585E-13
2.000E-00	1.75837E-08	8.05158E-11	-1.81879E-13
5.000E-00	4.34946E-08	1.20127E-10	-2.67765E-13
1.000E&01	6.35100E-08	1.29239E-10	-2.80749E-13
2.500E&01	6.09764E-08	3.85127E-11	-5.56956E-14
5.000E&01	1.03881E-07	-1.29920E-10	3.35528E-13
7.500E&01	1.44516E-07	-1.89076E-10	4.53443E-13
1.000E&02	1.26796E-07	-1.36346E-10	3.00964E-13
1.250E&02	1.30352E-07	-5.46035E-12	-3.61558E-14
1.500E&02	2.41684E-07	1.61863E-10	-4.54806E-13
2.000E&02	6.73163E-07	4.45216E-10	-1.14417E-12
2.500E&02	6.03129E-07	4.42424E-10	-1.10828E-12
3.000E&02	1.84209E-07	-1.44912E-11	5.57250E-14
3.500E&02	2.80149E-06	-9.74352E-10	2.45824E-12
4.000E&02	1.44646E-05	-2.36120E-09	5.90435E-12
4.500E&02	3.94028E-05	-3.97249E-09	9.88980E-12
5.000E&02	7.35072E-05	-5.47894E-09	1.36010E-11
6.000E&02	9.31326E-05	-6.23162E-09	1.54121E-11
7.000E&02	6.24105E-07	5.13032E-10	-1.26586E-12
8.000E&02	1.12350E-03	2.18465E-08	-5.38154E-11
9.000E&02	1.04491E-02	6.67943E-08	-1.64335E-10
1.000E&03	4.99532E-02	1.46318E-07	-3.59649E-10

PRESSURE, ATM.

S2DP

1.000E-00	9.71849E-17
2.000E-00	1.46310E-16
5.000E-00	2.14340E-16
1.000E&01	2.22564E-16
2.500E&01	3.57909E-17
5.000E&01	-2.81393E-16
7.500E&01	-3.70659E-16
1.000E&02	-2.37172E-16
1.250E&02	4.70734E-17
1.500E&02	3.96351E-16
2.000E&02	9.64987E-16
2.500E&02	9.24482E-16
3.000E&02	-5.63099E-17
3.500E&02	-2.06586E-15
4.000E&02	-4.93964E-15
4.500E&02	-8.25689E-15
5.000E&02	-1.13407E-14
6.000E&02	-1.28303E-14
7.000E&02	1.05275E-15
8.000E&02	4.47251E-14
9.000E&02	1.36508E-13
1.000E&03	2.98632E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-20

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	4.74796E-09	3.46956E-11	-7.98180E-14
2.000E-00	1.12910E-08	5.25376E-11	-1.20243E-13
5.000E-00	2.78056E-08	7.81563E-11	-1.76481E-13
1.000E&01	4.03678E-08	8.36500E-11	-1.84002E-13
2.500E&01	3.86223E-08	2.35096E-11	-3.30649E-14
5.000E&01	6.67419E-08	-8.59998E-11	2.24383E-13
7.500E&01	9.15989E-08	-1.22457E-10	2.96957E-13
1.000E&02	7.95472E-08	-8.52975E-11	1.89396E-13
1.250E&02	8.44826E-08	2.42290E-12	-3.90264E-14
1.500E&02	1.60776E-07	1.12616E-10	-3.18019E-13
2.000E&02	4.34428E-07	2.93245E-10	-7.62416E-13
2.500E&02	3.60408E-07	2.77093E-10	-7.02279E-13
3.000E&02	1.32440E-07	-4.41937E-11	1.25418E-13
3.500E&02	2.11738E-06	-6.97447E-10	1.78099E-12
4.000E&02	1.02630E-05	-1.62431E-09	4.11359E-12
4.500E&02	2.69592E-05	-2.68009E-09	6.75860E-12
5.000E&02	4.86433E-05	-3.63371E-09	9.13775E-12
6.000E&02	5.44091E-05	-3.88193E-09	9.72655E-12
7.000E&02	4.97494E-06	1.18035E-09	-2.95065E-12
8.000E&02	9.57450E-04	1.64332E-08	-4.10132E-11
9.000E&02	8.15017E-03	4.80653E-08	-1.19814E-10
1.000E&03	3.77002E-02	1.03567E-07	-2.57925E-10

PRESSURE, ATM.

S2DP

1.000E-00	6.51735E-17
2.000E-00	9.79967E-17
5.000E-00	1.43113E-16
1.000E&01	1.47742E-16
2.500E&01	2.08833E-17
5.000E&01	-1.90498E-16
7.500E&01	-2.45743E-16
1.000E&02	-1.50674E-16
1.250E&02	4.43207E-17
1.500E&02	2.80044E-16
2.000E&02	6.51132E-16
2.500E&02	5.93115E-16
3.000E&02	-1.12962E-16
3.500E&02	-1.51566E-15
4.000E&02	-3.48624E-15
4.500E&02	-5.71656E-15
5.000E&02	-7.71921E-15
6.000E&02	-8.20370E-15
7.000E&02	2.48625E-15
8.000E&02	3.45349E-14
9.000E&02	1.00838E-13
1.000E&03	2.16993E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-21

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.66944E-08	1.07020E-10	-2.19864E-13
2.000E-00	4.03705E-08	1.63651E-10	-3.34596E-13
5.000E-00	1.03171E-07	2.49416E-10	-5.03711E-13
1.000E&01	1.57194E-07	2.78415E-10	-5.49638E-13
2.500E&01	1.56489E-07	1.16758E-10	-1.82227E-13
5.000E&01	2.37193E-07	-2.31259E-10	5.54701E-13
7.500E&01	3.60016E-07	-3.97834E-10	8.76017E-13
1.000E&02	3.47875E-07	-3.53877E-10	7.34464E-13
1.250E&02	3.04648E-07	-1.45451E-10	2.38312E-13
1.500E&02	4.33905E-07	1.61642E-10	-4.64380E-13
2.000E&02	1.39053E-06	8.00259E-10	-1.88690E-12
2.500E&02	1.96856E-06	1.07523E-09	-2.46038E-12
3.000E&02	8.70482E-07	6.36204E-10	-1.42008E-12
3.500E&02	1.35812E-06	-6.99233E-10	1.62492E-12
4.000E&02	1.32762E-05	-2.93370E-09	6.66719E-12
4.500E&02	4.95577E-05	-5.88560E-09	1.32919E-11
5.000E&02	1.17262E-04	-9.18799E-09	2.06748E-11
6.000E&02	2.82357E-04	-1.44545E-08	3.23829E-11
7.000E&02	1.96324E-04	-1.21366E-08	2.71168E-11
8.000E&02	6.88535E-05	7.21829E-09	-1.60978E-11
9.000E&02	4.09689E-03	5.58440E-08	-1.24370E-10
1.000E&03	2.89224E-02	1.48696E-07	-3.30812E-10

PRESSURE, ATM.

S2DP

1.000E-00	1.60403E-16
2.000E-00	2.43685E-16
5.000E-00	3.65222E-16
1.000E&01	3.95203E-16
2.500E&01	1.18254E-16
5.000E&01	-4.24059E-16
7.500E&01	-6.51586E-16
1.000E&02	-5.33398E-16
1.250E&02	-1.52297E-16
1.500E&02	3.80121E-16
2.000E&02	1.44703E-15
2.500E&02	1.86473E-15
3.000E&02	1.06307E-15
3.500E&02	-1.24722E-15
4.000E&02	-5.05672E-15
4.500E&02	-1.00506E-14
5.000E&02	-1.56074E-14
6.000E&02	-2.43994E-14
7.000E&02	-2.04085E-14
8.000E&02	1.21062E-14
9.000E&02	9.34796E-14
1.000E&03	2.48541E-13

TABLE 2. - VARIANCES AND COVARIANCES AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-22

PRESSURE, ATM.	S2P	S2BP	S2CP
1.000E-00	1.78194E-09	1.56364E-11	-4.19953E-14
2.000E-00	4.13336E-09	2.33305E-11	-6.23058E-14
5.000E-00	9.62675E-09	3.34335E-11	-8.79196E-14
1.000E&01	1.30048E-08	3.34055E-11	-8.50332E-14
2.500E&01	1.22884E-08	1.93508E-12	5.83981E-15
5.000E&01	2.42997E-08	-4.32118E-11	1.27886E-13
7.500E&01	2.75325E-08	-4.66242E-11	1.28228E-13
1.000E&02	2.36673E-08	-1.53005E-11	3.02573E-14
1.250E&02	4.12233E-08	3.41016E-11	-1.16878E-13
1.500E&02	8.66378E-08	8.40764E-11	-2.62362E-13
2.000E&02	1.34992E-07	1.25834E-10	-3.76008E-13
2.500E&02	3.49623E-08	2.19559E-11	-5.93982E-14
3.000E&02	5.45276E-07	-2.57533E-10	7.69688E-13
3.500E&02	3.30254E-06	-6.79866E-10	2.01164E-12
4.000E&02	9.06295E-06	-1.14807E-09	3.38112E-12
4.500E&02	1.51919E-05	-1.50072E-09	4.40653E-12
5.000E&02	1.52434E-05	-1.51224E-09	4.43088E-12
6.000E&02	3.29289E-06	7.07924E-10	-2.06821E-12
7.000E&02	4.79428E-04	8.57832E-09	-2.50139E-11
8.000E&02	4.43204E-03	2.61558E-08	-7.61656E-11
9.000E&02	2.20672E-02	5.84816E-08	-1.70123E-10
1.000E&03	8.01026E-02	1.11591E-07	-3.24360E-10

PRESSURE, ATM.

S2DP

1.000E-00	3.99982E-17
2.000E-00	5.92158E-17
5.000E-00	8.30682E-17
1.000E&01	7.93237E-17
2.500E&01	-9.39694E-18
5.000E&01	-1.25576E-16
7.500E&01	-1.22304E-16
1.000E&02	-2.36352E-17
1.250E&02	1.21935E-16
1.500E&02	2.64560E-16
2.000E&02	3.72485E-16
2.500E&02	5.52681E-17
3.000E&02	-7.65848E-16
3.500E&02	-1.99130E-15
4.000E&02	-3.33950E-15
4.500E&02	-4.34636E-15
5.000E&02	-4.36625E-15
6.000E&02	2.03547E-15
7.000E&02	2.45979E-14
8.000E&02	7.48556E-14
9.000E&02	1.67125E-13
1.000E&03	3.18538E-13

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-1

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005360494E-00	1.28161E-06
2.000E-00	1.0010719601E-00	2.52219E-06
5.000E-00	1.0026788606E-00	6.14962E-06
1.000E&01	1.0053542634E-00	1.19975E-05
2.500E&01	1.0133598684E-00	2.84944E-05
5.000E&01	1.0266347242E-00	5.31248E-05
7.500E&01	1.0398263576E-00	7.45610E-05
1.000E&02	1.0529365590E-00	9.30521E-05
1.250E&02	1.0659671186E-00	1.08802E-04
1.500E&02	1.0789198267E-00	1.22011E-04
2.000E&02	1.1045988492E-00	1.41623E-04
2.500E&02	1.1299879489E-00	1.53623E-04
3.000E&02	1.1551014478E-00	1.59909E-04
3.500E&02	1.1799536681E-00	1.62525E-04
4.000E&02	1.2045589320E-00	1.63624E-04
4.500E&02	1.2289315616E-00	1.65443E-04
5.000E&02	1.2530858791E-00	1.70304E-04
6.000E&02	1.3007968664E-00	1.99534E-04
7.000E&02	1.3478064711E-00	2.75990E-04
8.000E&02	1.3942292706E-00	4.29547E-04
9.000E&02	1.4401798421E-00	6.91462E-04
1.000E&03	1.4857727628E-00	1.09417E-03

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-2

PRESSURE, ATM.

Z

SZ

1.000E-00	1.0005359757E-00	1.27694E-06
2.000E-00	1.0010718137E-00	2.51152E-06
5.000E-00	1.0026785025E-00	6.12026E-06
1.000E&01	1.0053535731E-00	1.19401E-05
2.500E&01	1.0133583297E-00	2.83953E-05
5.000E&01	1.0266322327E-00	5.31134E-05
7.500E&01	1.0398234275E-00	7.48264E-05
1.000E&02	1.0529336329E-00	9.37631E-05
1.250E&02	1.0659645676E-00	1.10103E-04
1.500E&02	1.0789179503E-00	1.24016E-04
2.000E&02	1.1045989342E-00	1.45265E-04
2.500E&02	1.1299903343E-00	1.58985E-04
3.000E&02	1.1551059002E-00	1.66798E-04
3.500E&02	1.1799593813E-00	1.70461E-04
4.000E&02	1.2045645273E-00	1.71846E-04
4.500E&02	1.2289350877E-00	1.72901E-04
5.000E&02	1.2530848120E-00	1.75642E-04
6.000E&02	1.3007767507E-00	1.94867E-04
7.000E&02	1.3477503399E-00	2.49691E-04
8.000E&02	1.3941155759E-00	3.65515E-04
9.000E&02	1.4399824553E-00	5.70163E-04
1.000E&03	1.4854609744E-00	8.92114E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-3

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005373486E-00	1.59521E-06
2.000E-00	1.0010745556E-00	3.13693E-06
5.000E-00	1.0026853276E-00	7.64288E-06
1.000E&01	1.0053671244E-00	1.49100E-05
2.500E&01	1.0133914743E-00	3.54672E-05
5.000E&01	1.0266961259E-00	6.63906E-05
7.500E&01	1.0399157663E-00	9.36134E-05
1.000E&02	1.0530522073E-00	1.17416E-04
1.250E&02	1.0661072605E-00	1.38015E-04
1.500E&02	1.0790827377E-00	1.55618E-04
2.000E&02	1.1048022108E-00	1.82670E-04
2.500E&02	1.1302251201E-00	2.00349E-04
3.000E&02	1.1553659592E-00	2.10601E-04
3.500E&02	1.1802392216E-00	2.15546E-04
4.000E&02	1.2048594010E-00	2.17441E-04
4.500E&02	1.2292409908E-00	2.18642E-04
5.000E&02	1.2533984847E-00	2.21587E-04
6.000E&02	1.3010991590E-00	2.43134E-04
7.000E&02	1.3480773724E-00	3.06095E-04
8.000E&02	1.3944490734E-00	4.40882E-04
9.000E&02	1.4403302108E-00	6.81318E-04
1.000E&03	1.4858367329E-00	1.06208E-03

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-4

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005360710E-00	6.77415E-07
2.000E-00	1.0010720054E-00	1.33207E-06
5.000E-00	1.0026789894E-00	3.24544E-06
1.000E&01	1.0053545719E-00	6.33146E-06
2.500E&01	1.0133610101E-00	1.50630E-05
5.000E&01	1.0266381698E-00	2.82049E-05
7.500E&01	1.0398331326E-00	3.97837E-05
1.000E&02	1.0529475519E-00	4.99175E-05
1.250E&02	1.0659830813E-00	5.86978E-05
1.500E&02	1.0789413743E-00	6.62107E-05
2.000E&02	1.1046328652E-00	7.77855E-05
2.500E&02	1.1300352527E-00	8.53842E-05
3.000E&02	1.1551617649E-00	8.98217E-05
3.500E&02	1.1800256300E-00	9.19846E-05
4.000E&02	1.2046400762E-00	9.28180E-05
4.500E&02	1.2290183315E-00	9.33103E-05
5.000E&02	1.2531736241E-00	9.44834E-05
6.000E&02	1.3008682337E-00	1.03231E-04
7.000E&02	1.3478297302E-00	1.29067E-04
8.000E&02	1.3941639386E-00	1.84672E-04
9.000E&02	1.4399766841E-00	2.84198E-04
1.000E&03	1.4853737917E-00	4.42115E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-5

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005364627E-00	1.57338E-06
2.000E-00	1.0010727853E-00	3.09421E-06
5.000E-00	1.0026809132E-00	7.53936E-06
1.000E&01	1.0053583338E-00	1.47084E-05
2.500E&01	1.0133697842E-00	3.49852E-05
5.000E&01	1.0266537031E-00	6.54733E-05
7.500E&01	1.0398535739E-00	9.22946E-05
1.000E&02	1.0529712135E-00	1.15727E-04
1.250E&02	1.0660084393E-00	1.35987E-04
1.500E&02	1.0789670683E-00	1.53280E-04
2.000E&02	1.1046558042E-00	1.79805E-04
2.500E&02	1.1300519585E-00	1.97073E-04
3.000E&02	1.1551700681E-00	2.07031E-04
3.500E&02	1.1800246700E-00	2.11790E-04
4.000E&02	1.2046303011E-00	2.13602E-04
4.500E&02	1.2290014986E-00	2.14815E-04
5.000E&02	1.2531527994E-00	2.17858E-04
6.000E&02	1.3008538588E-00	2.39844E-04
7.000E&02	1.3478497756E-00	3.03616E-04
8.000E&02	1.3942568456E-00	4.39614E-04
9.000E&02	1.4401913649E-00	6.81567E-04
1.000E&03	1.4857696296E-00	1.06409E-03

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-6

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005347297E-00	1.71756E-06
2.000E-00	1.0010693298E-00	3.37767E-06
5.000E-00	1.0026723528E-00	8.22996E-06
1.000E&01	1.0053414726E-00	1.60562E-05
2.500E&01	1.0133295437E-00	3.81975E-05
5.000E&01	1.0265793592E-00	7.15107E-05
7.500E&01	1.0397508179E-00	1.00845E-04
1.000E&02	1.0528452914E-00	1.26503E-04
1.250E&02	1.0658641512E-00	1.48717E-04
1.500E&02	1.0788087686E-00	1.67709E-04
2.000E&02	1.1044807629E-00	1.96923E-04
2.500E&02	1.1298722463E-00	2.16046E-04
3.000E&02	1.1549941908E-00	2.27164E-04
3.500E&02	1.1798575685E-00	2.32544E-04
4.000E&02	1.2044733515E-00	2.34606E-04
4.500E&02	1.2288525119E-00	2.35876E-04
5.000E&02	1.2530060215E-00	2.38968E-04
6.000E&02	1.3006799772E-00	2.61781E-04
7.000E&02	1.3475829950E-00	3.28702E-04
8.000E&02	1.3938028514E-00	4.72130E-04
9.000E&02	1.4394273227E-00	7.27925E-04
1.000E&03	1.4845441853E-00	1.13243E-03

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-7

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005343688E-00	6.45266E-07
2.000E-00	1.0010686072E-00	1.26897E-06
5.000E-00	1.0026705405E-00	3.09202E-06
1.000E&01	1.0053378282E-00	6.03242E-06
2.500E&01	1.0133202889E-00	1.43508E-05
5.000E&01	1.0265604039E-00	2.68650E-05
7.500E&01	1.0397217796E-00	3.78827E-05
1.000E&02	1.0528058504E-00	4.75173E-05
1.250E&02	1.0658140509E-00	5.58568E-05
1.500E&02	1.0787478153E-00	6.29842E-05
2.000E&02	1.1043977746E-00	7.39425E-05
2.500E&02	1.1297672040E-00	8.11084E-05
3.000E&02	1.1548675795E-00	8.52684E-05
3.500E&02	1.1797103770E-00	8.72769E-05
4.000E&02	1.2043070725E-00	8.80451E-05
4.500E&02	1.2286691418E-00	8.85249E-05
5.000E&02	1.2528080608E-00	8.97006E-05
6.000E&02	1.3004623515E-00	9.83467E-05
7.000E&02	1.3473617519E-00	1.23662E-04
8.000E&02	1.3935980692E-00	1.77875E-04
9.000E&02	1.4392631107E-00	2.74523E-04
1.000E&03	1.4844486834E-00	4.27355E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-8

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005358492E-00	7.39684E-07
2.000E-00	1.0010715604E-00	1.45463E-06
5.000E-00	1.0026778663E-00	3.54430E-06
1.000E&01	1.0053522906E-00	6.91458E-06
2.500E&01	1.0133550522E-00	1.64483E-05
5.000E&01	1.0266254559E-00	3.07881E-05
7.500E&01	1.0398129612E-00	4.34098E-05
1.000E&02	1.0529193179E-00	5.44435E-05
1.250E&02	1.0659462760E-00	6.39906E-05
1.500E&02	1.0788955852E-00	7.21464E-05
2.000E&02	1.1045682572E-00	8.46753E-05
2.500E&02	1.1299513332E-00	9.28558E-05
3.000E&02	1.1550588125E-00	9.75939E-05
3.500E&02	1.1799046945E-00	9.98741E-05
4.000E&02	1.2045029784E-00	1.00745E-04
4.500E&02	1.2288676637E-00	1.01302E-04
5.000E&02	1.2530127497E-00	1.02679E-04
6.000E&02	1.3007001211E-00	1.12735E-04
7.000E&02	1.3476770871E-00	1.42090E-04
8.000E&02	1.3940556426E-00	2.04893E-04
9.000E&02	1.4399477821E-00	3.16866E-04
1.000E&03	1.4854655003E-00	4.94121E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-9

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005290567E-00	2.27254E-06
2.000E-00	1.0010580088E-00	4.47081E-06
5.000E-00	1.0026442380E-00	1.08980E-05
1.000E&01	1.0052858641E-00	2.12646E-05
2.500E&01	1.0131951044E-00	5.05696E-05
5.000E&01	1.0263252489E-00	9.45546E-05
7.500E&01	1.0393908577E-00	1.33142E-04
1.000E&02	1.0523923556E-00	1.66745E-04
1.250E&02	1.0653301668E-00	1.95691E-04
1.500E&02	1.0782047160E-00	2.20289E-04
2.000E&02	1.1037657264E-00	2.57720E-04
2.500E&02	1.1290787827E-00	2.81724E-04
3.000E&02	1.1541472809E-00	2.95244E-04
3.500E&02	1.1789746172E-00	3.01473E-04
4.000E&02	1.2035641875E-00	3.03804E-04
4.500E&02	1.2279193879E-00	3.05778E-04
5.000E&02	1.2520436146E-00	3.11054E-04
6.000E&02	1.2996127305E-00	3.47328E-04
7.000E&02	1.3462987039E-00	4.49352E-04
8.000E&02	1.3921287029E-00	6.62671E-04
9.000E&02	1.4371298962E-00	1.03569E-03
1.000E&03	1.4813294520E-00	1.61613E-03

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-10

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005338368E-00	1.06774E-06
2.000E-00	1.0010675448E-00	2.09969E-06
5.000E-00	1.0026678973E-00	5.11591E-06
1.000E&01	1.0053325847E-00	9.98101E-06
2.500E&01	1.0133074975E-00	2.37477E-05
5.000E&01	1.0265358507E-00	4.44716E-05
7.500E&01	1.0396864408E-00	6.27350E-05
1.000E&02	1.0527606490E-00	7.87240E-05
1.250E&02	1.0657598566E-00	9.25824E-05
1.500E&02	1.0786854448E-00	1.04445E-04
2.000E&02	1.1043212885E-00	1.22736E-04
2.500E&02	1.1296792300E-00	1.34762E-04
3.000E&02	1.1547703195E-00	1.41800E-04
3.500E&02	1.1796056071E-00	1.45241E-04
4.000E&02	1.2041961430E-00	1.46568E-04
4.500E&02	1.2285529774E-00	1.47332E-04
5.000E&02	1.2526871602E-00	1.49138E-04
6.000E&02	1.3003317721E-00	1.62714E-04
7.000E&02	1.3472183798E-00	2.02960E-04
8.000E&02	1.3934353843E-00	2.89695E-04
9.000E&02	1.4390711867E-00	4.45001E-04
1.000E&03	1.4842141880E-00	6.91294E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-11

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005348928E-00	6.98262E-07
2.000E-00	1.0010696522E-00	1.37315E-06
5.000E-00	1.0026731309E-00	3.34575E-06
1.000E&01	1.0053429366E-00	6.52735E-06
2.500E&01	1.0133325264E-00	1.55286E-05
5.000E&01	1.0265831647E-00	2.90722E-05
7.500E&01	1.0397534691E-00	4.09993E-05
1.000E&02	1.0528449938E-00	5.14323E-05
1.250E&02	1.0658592931E-00	6.04661E-05
1.500E&02	1.0787979211E-00	6.81900E-05
2.000E&02	1.1044543806E-00	8.00740E-05
2.500E&02	1.1298268062E-00	8.78562E-05
3.000E&02	1.1549276316E-00	9.23834E-05
3.500E&02	1.1797692907E-00	9.45766E-05
4.000E&02	1.2043642176E-00	9.54174E-05
4.500E&02	1.2287248459E-00	9.59318E-05
5.000E&02	1.2528636096E-00	9.71805E-05
6.000E&02	1.3005252788E-00	1.06412E-04
7.000E&02	1.3474486961E-00	1.33529E-04
8.000E&02	1.3937333324E-00	1.91715E-04
9.000E&02	1.4394786589E-00	2.95619E-04
1.000E&03	1.4847841466E-00	4.60174E-04

TABLE 2 - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

NON MO. HE-0-11

2	3	PRESSURE, ATM.
1.000000	1.000000	1.000000
1.000000	1.000000	2.000000
1.000000	1.000000	3.000000
1.000000	1.000000	4.000000
1.000000	1.000000	5.000000
1.000000	1.000000	6.000000
1.000000	1.000000	7.000000
1.000000	1.000000	8.000000
1.000000	1.000000	9.000000
1.000000	1.000000	10.000000
1.000000	1.000000	11.000000
1.000000	1.000000	12.000000
1.000000	1.000000	13.000000
1.000000	1.000000	14.000000
1.000000	1.000000	15.000000
1.000000	1.000000	16.000000
1.000000	1.000000	17.000000
1.000000	1.000000	18.000000
1.000000	1.000000	19.000000
1.000000	1.000000	20.000000
1.000000	1.000000	21.000000
1.000000	1.000000	22.000000
1.000000	1.000000	23.000000
1.000000	1.000000	24.000000
1.000000	1.000000	25.000000
1.000000	1.000000	26.000000
1.000000	1.000000	27.000000
1.000000	1.000000	28.000000
1.000000	1.000000	29.000000
1.000000	1.000000	30.000000
1.000000	1.000000	31.000000
1.000000	1.000000	32.000000
1.000000	1.000000	33.000000
1.000000	1.000000	34.000000
1.000000	1.000000	35.000000
1.000000	1.000000	36.000000
1.000000	1.000000	37.000000
1.000000	1.000000	38.000000
1.000000	1.000000	39.000000
1.000000	1.000000	40.000000
1.000000	1.000000	41.000000
1.000000	1.000000	42.000000
1.000000	1.000000	43.000000
1.000000	1.000000	44.000000
1.000000	1.000000	45.000000
1.000000	1.000000	46.000000
1.000000	1.000000	47.000000
1.000000	1.000000	48.000000
1.000000	1.000000	49.000000
1.000000	1.000000	50.000000

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-12

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005335239E-00	1.00759E-06
2.000E-00	1.0010669210E-00	1.98164E-06
5.000E-00	1.0026663514E-00	4.82886E-06
1.000E&01	1.0053295381E-00	9.42116E-06
2.500E&01	1.0133002136E-00	2.24111E-05
5.000E&01	1.0265223516E-00	4.19456E-05
7.500E&01	1.0396677206E-00	5.91336E-05
1.000E&02	1.0527376270E-00	7.41534E-05
1.250E&02	1.0657333771E-00	8.71436E-05
1.500E&02	1.0786562776E-00	9.82352E-05
2.000E&02	1.1042887550E-00	1.15258E-04
2.500E&02	1.1296455109E-00	1.26354E-04
3.000E&02	1.1547369967E-00	1.32763E-04
3.500E&02	1.1795736642E-00	1.35833E-04
4.000E&02	1.2041659648E-00	1.37001E-04
4.500E&02	1.2285243502E-00	1.37767E-04
5.000E&02	1.2526592719E-00	1.39682E-04
6.000E&02	1.3003005308E-00	1.53602E-04
7.000E&02	1.3471733540E-00	1.94072E-04
8.000E&02	1.3933613542E-00	2.80390E-04
9.000E&02	1.4389481442E-00	4.33793E-04
1.000E&03	1.4840173365E-00	6.75768E-04

TABLE 3 - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. 46-0-15

25	1	PRESSURE, ATM.
1.000000	1.0000000000000000	1.000000
1.000000	1.0000000000000000	2.000000
1.000000	1.0000000000000000	3.000000
1.000000	1.0000000000000000	4.000000
1.000000	1.0000000000000000	5.000000
1.000000	1.0000000000000000	6.000000
1.000000	1.0000000000000000	7.000000
1.000000	1.0000000000000000	8.000000
1.000000	1.0000000000000000	9.000000
1.000000	1.0000000000000000	10.000000
1.000000	1.0000000000000000	11.000000
1.000000	1.0000000000000000	12.000000
1.000000	1.0000000000000000	13.000000
1.000000	1.0000000000000000	14.000000
1.000000	1.0000000000000000	15.000000
1.000000	1.0000000000000000	16.000000
1.000000	1.0000000000000000	17.000000
1.000000	1.0000000000000000	18.000000
1.000000	1.0000000000000000	19.000000
1.000000	1.0000000000000000	20.000000
1.000000	1.0000000000000000	21.000000
1.000000	1.0000000000000000	22.000000
1.000000	1.0000000000000000	23.000000
1.000000	1.0000000000000000	24.000000
1.000000	1.0000000000000000	25.000000
1.000000	1.0000000000000000	26.000000
1.000000	1.0000000000000000	27.000000
1.000000	1.0000000000000000	28.000000
1.000000	1.0000000000000000	29.000000
1.000000	1.0000000000000000	30.000000
1.000000	1.0000000000000000	31.000000
1.000000	1.0000000000000000	32.000000
1.000000	1.0000000000000000	33.000000
1.000000	1.0000000000000000	34.000000
1.000000	1.0000000000000000	35.000000
1.000000	1.0000000000000000	36.000000
1.000000	1.0000000000000000	37.000000
1.000000	1.0000000000000000	38.000000
1.000000	1.0000000000000000	39.000000
1.000000	1.0000000000000000	40.000000
1.000000	1.0000000000000000	41.000000
1.000000	1.0000000000000000	42.000000
1.000000	1.0000000000000000	43.000000
1.000000	1.0000000000000000	44.000000
1.000000	1.0000000000000000	45.000000
1.000000	1.0000000000000000	46.000000
1.000000	1.0000000000000000	47.000000
1.000000	1.0000000000000000	48.000000
1.000000	1.0000000000000000	49.000000
1.000000	1.0000000000000000	50.000000

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-13

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005032179E-00	7.97814E-06
2.000E-00	1.0010064943E-00	1.57003E-05
5.000E-00	1.0025166693E-00	3.82913E-05
1.000E&01	1.0050347567E-00	7.47579E-05
2.500E&01	1.0125970173E-00	1.78014E-04
5.000E&01	1.0252243874E-00	3.33514E-04
7.500E&01	1.0378757375E-00	4.70595E-04
1.000E&02	1.0505446948E-00	5.90669E-04
1.250E&02	1.0632248865E-00	6.94827E-04
1.500E&02	1.0759099399E-00	7.84087E-04
2.000E&02	1.1012691401E-00	9.22012E-04
2.500E&02	1.1265713132E-00	1.01302E-03
3.000E&02	1.1517654766E-00	1.06651E-03
3.500E&02	1.1768006479E-00	1.09272E-03
4.000E&02	1.2016258448E-00	1.10269E-03
4.500E&02	1.2261900847E-00	1.10804E-03
5.000E&02	1.2504423853E-00	1.12082E-03
6.000E&02	1.2978072389E-00	1.21957E-03
7.000E&02	1.3433125462E-00	1.51237E-03
8.000E&02	1.3865504478E-00	2.13289E-03
9.000E&02	1.4271130843E-00	3.21114E-03
1.000E&03	1.4645925964E-00	4.84800E-03

TABLE 3. - COMPARISON OF MEASUREMENTS AND STANDARD ERRORS AT SEVEN
INCREMENTS OF PRESSURE

ROW NO. ME-0-13

25	5	PRESSURE, ATM.
1.0000-00	1.00000000-00	1.0000-00
2.0000-00	1.00000000-00	2.0000-00
3.0000-00	1.00000000-00	3.0000-00
4.0000-00	1.00000000-00	4.0000-00
5.0000-00	1.00000000-00	5.0000-00
6.0000-00	1.00000000-00	6.0000-00
7.0000-00	1.00000000-00	7.0000-00
8.0000-00	1.00000000-00	8.0000-00
9.0000-00	1.00000000-00	9.0000-00
1.0000-00	1.00000000-00	1.0000-00
2.0000-00	1.00000000-00	2.0000-00
3.0000-00	1.00000000-00	3.0000-00
4.0000-00	1.00000000-00	4.0000-00
5.0000-00	1.00000000-00	5.0000-00
6.0000-00	1.00000000-00	6.0000-00
7.0000-00	1.00000000-00	7.0000-00
8.0000-00	1.00000000-00	8.0000-00
9.0000-00	1.00000000-00	9.0000-00
1.0000-00	1.00000000-00	1.0000-00
2.0000-00	1.00000000-00	2.0000-00
3.0000-00	1.00000000-00	3.0000-00
4.0000-00	1.00000000-00	4.0000-00
5.0000-00	1.00000000-00	5.0000-00
6.0000-00	1.00000000-00	6.0000-00
7.0000-00	1.00000000-00	7.0000-00
8.0000-00	1.00000000-00	8.0000-00
9.0000-00	1.00000000-00	9.0000-00
1.0000-00	1.00000000-00	1.0000-00
2.0000-00	1.00000000-00	2.0000-00
3.0000-00	1.00000000-00	3.0000-00
4.0000-00	1.00000000-00	4.0000-00
5.0000-00	1.00000000-00	5.0000-00
6.0000-00	1.00000000-00	6.0000-00
7.0000-00	1.00000000-00	7.0000-00
8.0000-00	1.00000000-00	8.0000-00
9.0000-00	1.00000000-00	9.0000-00

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-14

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005345827E-00	1.00546E-06
2.000E-00	1.0010690334E-00	1.97742E-06
5.000E-00	1.0026715946E-00	4.81844E-06
1.000E&01	1.0053398990E-00	9.40061E-06
2.500E&01	1.0133251914E-00	2.23614E-05
5.000E&01	1.0265693289E-00	4.18509E-05
7.500E&01	1.0397339123E-00	5.89979E-05
1.000E&02	1.0528204416E-00	7.39804E-05
1.250E&02	1.0658304168E-00	8.69367E-05
1.500E&02	1.0787653378E-00	9.79977E-05
2.000E&02	1.1044160170E-00	1.14969E-04
2.500E&02	1.1297844787E-00	1.26025E-04
3.000E&02	1.1548827227E-00	1.32407E-04
3.500E&02	1.1797227484E-00	1.35461E-04
4.000E&02	1.2043165555E-00	1.36623E-04
4.500E&02	1.2286761435E-00	1.37392E-04
5.000E&02	1.2528135121E-00	1.39318E-04
6.000E&02	1.3004695893E-00	1.53278E-04
7.000E&02	1.3473807839E-00	1.93821E-04
8.000E&02	1.3936430925E-00	2.80280E-04
9.000E&02	1.4393525119E-00	4.33985E-04
1.000E&03	1.4846050388E-00	6.76634E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-15

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005343248E-00	9.50329E-07
2.000E-00	1.0010685198E-00	1.86878E-06
5.000E-00	1.0026703266E-00	4.55322E-06
1.000E&01	1.0053374163E-00	8.88311E-06
2.500E&01	1.0133193756E-00	2.11353E-05
5.000E&01	1.0265589481E-00	3.95792E-05
7.500E&01	1.0397201185E-00	5.58335E-05
1.000E&02	1.0528042877E-00	7.00637E-05
1.250E&02	1.0658128567E-00	8.23977E-05
1.500E&02	1.0787472265E-00	9.29558E-05
2.000E&02	1.1043989727E-00	1.09235E-04
2.500E&02	1.1297707342E-00	1.19938E-04
3.000E&02	1.1548737189E-00	1.26202E-04
3.500E&02	1.1797191348E-00	1.29265E-04
4.000E&02	1.2043181900E-00	1.30446E-04
4.500E&02	1.2286820923E-00	1.31128E-04
5.000E&02	1.2528220498E-00	1.32736E-04
6.000E&02	1.3004749621E-00	1.44823E-04
7.000E&02	1.3473665908E-00	1.80648E-04
8.000E&02	1.3935865997E-00	2.57849E-04
9.000E&02	1.4392246525E-00	3.96079E-04
1.000E&03	1.4843704130E-00	6.15291E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-16

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005334406E-00	2.32534E-07
2.000E-00	1.0010667546E-00	4.57288E-07
5.000E-00	1.0026659374E-00	1.11422E-06
1.000E&01	1.0053287167E-00	2.17384E-06
2.500E&01	1.0132982092E-00	5.17205E-06
5.000E&01	1.0265185035E-00	9.68457E-06
7.500E&01	1.0396621833E-00	1.36601E-05
1.000E&02	1.0527305489E-00	1.71394E-05
1.250E&02	1.0657249008E-00	2.01539E-05
1.500E&02	1.0786465393E-00	2.27331E-05
2.000E&02	1.1042768778E-00	2.67065E-05
2.500E&02	1.1296319675E-00	2.93147E-05
3.000E&02	1.1547222114E-00	3.08375E-05
3.500E&02	1.1795580128E-00	3.15791E-05
4.000E&02	1.2041497747E-00	3.18641E-05
4.500E&02	1.2285079003E-00	3.20321E-05
5.000E&02	1.2526427926E-00	3.24340E-05
6.000E&02	1.3002844900E-00	3.54368E-05
7.000E&02	1.3471580917E-00	4.43060E-05
8.000E&02	1.3933468228E-00	6.33806E-05
9.000E&02	1.4389339081E-00	9.74779E-05
1.000E&03	1.4840025724E-00	1.51476E-04

TABLE 1. - CORRELATION OF PRESSURE AND STANDARD ERRORS AT EVEN
INCREMENTS OF PRESSURE

RUN NO. HE-0-10

PRESSURE, PSI	1	2
1.000E00	1.000E00	1.000E00
2.000E00	1.000E00	2.000E00
3.000E00	1.000E00	3.000E00
4.000E00	1.000E00	4.000E00
5.000E00	1.000E00	5.000E00
6.000E00	1.000E00	6.000E00
7.000E00	1.000E00	7.000E00
8.000E00	1.000E00	8.000E00
9.000E00	1.000E00	9.000E00
1.000E01	1.000E00	1.000E01
2.000E01	1.000E00	2.000E01
3.000E01	1.000E00	3.000E01
4.000E01	1.000E00	4.000E01
5.000E01	1.000E00	5.000E01
6.000E01	1.000E00	6.000E01
7.000E01	1.000E00	7.000E01
8.000E01	1.000E00	8.000E01
9.000E01	1.000E00	9.000E01
1.000E02	1.000E00	1.000E02
2.000E02	1.000E00	2.000E02
3.000E02	1.000E00	3.000E02
4.000E02	1.000E00	4.000E02
5.000E02	1.000E00	5.000E02
6.000E02	1.000E00	6.000E02
7.000E02	1.000E00	7.000E02
8.000E02	1.000E00	8.000E02
9.000E02	1.000E00	9.000E02
1.000E03	1.000E00	1.000E03
2.000E03	1.000E00	2.000E03
3.000E03	1.000E00	3.000E03
4.000E03	1.000E00	4.000E03
5.000E03	1.000E00	5.000E03
6.000E03	1.000E00	6.000E03
7.000E03	1.000E00	7.000E03
8.000E03	1.000E00	8.000E03
9.000E03	1.000E00	9.000E03
1.000E04	1.000E00	1.000E04
2.000E04	1.000E00	2.000E04
3.000E04	1.000E00	3.000E04
4.000E04	1.000E00	4.000E04
5.000E04	1.000E00	5.000E04
6.000E04	1.000E00	6.000E04
7.000E04	1.000E00	7.000E04
8.000E04	1.000E00	8.000E04
9.000E04	1.000E00	9.000E04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-17

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005334697E-00	1.94497E-07
2.000E-00	1.0010668128E-00	3.82522E-07
5.000E-00	1.0026660827E-00	9.32129E-07
1.000E&01	1.0053290060E-00	1.81859E-06
2.500E&01	1.0132989238E-00	4.32610E-06
5.000E&01	1.0265199013E-00	8.09693E-06
7.500E&01	1.0396642293E-00	1.14148E-05
1.000E&02	1.0527332046E-00	1.43142E-05
1.250E&02	1.0657281241E-00	1.68218E-05
1.500E&02	1.0786502846E-00	1.89630E-05
2.000E&02	1.1042815160E-00	2.22493E-05
2.500E&02	1.1296372734E-00	2.43914E-05
3.000E&02	1.1547279315E-00	2.56288E-05
3.500E&02	1.1795638651E-00	2.62216E-05
4.000E&02	1.2041554488E-00	2.64470E-05
4.500E&02	1.2285130573E-00	2.65947E-05
5.000E&02	1.2526470653E-00	2.69640E-05
6.000E&02	1.3002857786E-00	2.96494E-05
7.000E&02	1.3471545861E-00	3.74580E-05
8.000E&02	1.3933364855E-00	5.41136E-05
9.000E&02	1.4389144742E-00	8.37139E-05
1.000E&03	1.4839715497E-00	1.30403E-04

TABLE 2. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-17

22	1	PRESSURE, ATM.
1.000000-00	1.0000000000-00	1.0000-00
1.000000-00	1.0000000000-00	2.0000-00
1.000000-00	1.0000000000-00	3.0000-00
1.000000-00	1.0000000000-00	4.0000-00
1.000000-00	1.0000000000-00	5.0000-00
1.000000-00	1.0000000000-00	6.0000-00
1.000000-00	1.0000000000-00	7.0000-00
1.000000-00	1.0000000000-00	8.0000-00
1.000000-00	1.0000000000-00	9.0000-00
1.000000-00	1.0000000000-00	10.0000-00
1.000000-00	1.0000000000-00	11.0000-00
1.000000-00	1.0000000000-00	12.0000-00
1.000000-00	1.0000000000-00	13.0000-00
1.000000-00	1.0000000000-00	14.0000-00
1.000000-00	1.0000000000-00	15.0000-00
1.000000-00	1.0000000000-00	16.0000-00
1.000000-00	1.0000000000-00	17.0000-00
1.000000-00	1.0000000000-00	18.0000-00
1.000000-00	1.0000000000-00	19.0000-00
1.000000-00	1.0000000000-00	20.0000-00
1.000000-00	1.0000000000-00	21.0000-00
1.000000-00	1.0000000000-00	22.0000-00
1.000000-00	1.0000000000-00	23.0000-00
1.000000-00	1.0000000000-00	24.0000-00
1.000000-00	1.0000000000-00	25.0000-00
1.000000-00	1.0000000000-00	26.0000-00
1.000000-00	1.0000000000-00	27.0000-00
1.000000-00	1.0000000000-00	28.0000-00
1.000000-00	1.0000000000-00	29.0000-00
1.000000-00	1.0000000000-00	30.0000-00

TABLE 3.- COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-18

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005322238E-00	1.16105E-06
2.000E-00	1.0010643265E-00	2.28336E-06
5.000E-00	1.0026599085E-00	5.56389E-06
1.000E&01	1.0053167956E-00	1.08554E-05
2.500E&01	1.0132694153E-00	2.58277E-05
5.000E&01	1.0264641653E-00	4.83597E-05
7.500E&01	1.0395853393E-00	6.82075E-05
1.000E&02	1.0526340266E-00	8.55743E-05
1.250E&02	1.0656113164E-00	1.00617E-04
1.500E&02	1.0785182982E-00	1.13485E-04
2.000E&02	1.1041256947E-00	1.33300E-04
2.500E&02	1.1294649303E-00	1.46297E-04
3.000E&02	1.1545447196E-00	1.53874E-04
3.500E&02	1.1793737770E-00	1.57556E-04
4.000E&02	1.2039608168E-00	1.58968E-04
4.500E&02	1.2283145536E-00	1.59810E-04
5.000E&02	1.2524437016E-00	1.61837E-04
6.000E&02	1.3000630894E-00	1.76949E-04
7.000E&02	1.3468886956E-00	2.21498E-04
8.000E&02	1.3929902355E-00	3.17166E-04
9.000E&02	1.4384374245E-00	4.87920E-04
1.000E&03	1.4832999780E-00	7.57882E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-19

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005345668E-00	7.14169E-07
2.000E-00	1.0010690020E-00	1.40459E-06
5.000E-00	1.0026715192E-00	3.42272E-06
1.000E&01	1.0053397585E-00	6.67765E-06
2.500E&01	1.0133249154E-00	1.58831E-05
5.000E&01	1.0265690175E-00	2.97208E-05
7.500E&01	1.0397337871E-00	4.18890E-05
1.000E&02	1.0528207049E-00	5.25145E-05
1.250E&02	1.0658312517E-00	6.16964E-05
1.500E&02	1.0787669084E-00	6.95284E-05
2.000E&02	1.1044194743E-00	8.15269E-05
2.500E&02	1.1297902491E-00	8.93205E-05
3.000E&02	1.1548910791E-00	9.37987E-05
3.500E&02	1.1797338105E-00	9.59270E-05
4.000E&02	1.2043302899E-00	9.67337E-05
4.500E&02	1.2286923634E-00	9.72921E-05
5.000E&02	1.2528318775E-00	9.87118E-05
6.000E&02	1.3004906129E-00	1.08896E-04
7.000E&02	1.3474012666E-00	1.38296E-04
8.000E&02	1.3936586096E-00	2.00783E-04
9.000E&02	1.4393574126E-00	3.11605E-04
1.000E&03	1.4845924464E-00	4.86259E-04

TABLE 3. - COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-20

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005338290E-00	5.81182E-07
2.000E-00	1.0010675299E-00	1.14321E-06
5.000E-00	1.0026678643E-00	2.78620E-06
1.000E&01	1.0053325322E-00	5.43596E-06
2.500E&01	1.0133074664E-00	1.29265E-05
5.000E&01	1.0265361088E-00	2.41721E-05
7.500E&01	1.0396872834E-00	3.40418E-05
1.000E&02	1.0527623464E-00	4.26406E-05
1.250E&02	1.0657626541E-00	5.00513E-05
1.500E&02	1.0786895627E-00	5.63529E-05
2.000E&02	1.1043286078E-00	6.59515E-05
2.500E&02	1.1296903316E-00	7.21194E-05
3.000E&02	1.1547855841E-00	7.56051E-05
3.500E&02	1.1796252152E-00	7.72203E-05
4.000E&02	1.2042200751E-00	7.78277E-05
4.500E&02	1.2285810136E-00	7.83267E-05
5.000E&02	1.2527188808E-00	7.96471E-05
6.000E&02	1.3003688011E-00	8.87688E-05
7.000E&02	1.3472566359E-00	1.14537E-04
8.000E&02	1.3934691851E-00	1.68656E-04
9.000E&02	1.4390932485E-00	2.63795E-04
1.000E&03	1.4842156262E-00	4.12794E-04

TABLE 3.- COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-21

PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005325437E-00	9.62207E-07
2.000E-00	1.0010649661E-00	1.89051E-06
5.000E-00	1.0026615058E-00	4.60226E-06
1.000E&01	1.0053199841E-00	8.97752E-06
2.500E&01	1.0132773395E-00	2.13912E-05
5.000E&01	1.0264798502E-00	4.02178E-05
7.500E&01	1.0396086076E-00	5.69988E-05
1.000E&02	1.0526646873E-00	7.18873E-05
1.250E&02	1.0656491648E-00	8.49935E-05
1.500E&02	1.0785631156E-00	9.64168E-05
2.000E&02	1.1041837392E-00	1.14613E-04
2.500E&02	1.1295351625E-00	1.27312E-04
3.000E&02	1.1546259896E-00	1.35436E-04
3.500E&02	1.1794648248E-00	1.39992E-04
4.000E&02	1.2040602724E-00	1.42072E-04
4.500E&02	1.2284209366E-00	1.42828E-04
5.000E&02	1.2525554217E-00	1.43461E-04
6.000E&02	1.3001802714E-00	1.49372E-04
7.000E&02	1.3470036554E-00	1.70707E-04
8.000E&02	1.3930944079E-00	2.21021E-04
9.000E&02	1.4385213627E-00	3.16647E-04
1.000E&03	1.4833533538E-00	4.74726E-04

TABLE 3.- COMPRESSIBILITY FACTORS AND STANDARD ERRORS AT EVEN INCREMENTS OF PRESSURE

RUN NO. HE-0-22		
PRESSURE, ATM.	Z	SZ
1.000E-00	1.0005339190E-00	4.24388E-07
2.000E-00	1.0010677075E-00	8.35963E-07
5.000E-00	1.0026682914E-00	2.03989E-06
1.000E&01	1.00533333310E-00	3.97920E-06
2.500E&01	1.0133090607E-00	9.42653E-06
5.000E&01	1.0265380471E-00	1.74684E-05
7.500E&01	1.0396884873E-00	2.43481E-05
1.000E&02	1.0527619091E-00	3.01621E-05
1.250E&02	1.0657598406E-00	3.49949E-05
1.500E&02	1.0786838099E-00	3.89303E-05
2.000E&02	1.1043159736E-00	4.44598E-05
2.500E&02	1.1296706244E-00	4.74912E-05
3.000E&02	1.1547599863E-00	4.88278E-05
3.500E&02	1.1795962833E-00	4.93240E-05
4.000E&02	1.2041917395E-00	4.98691E-05
4.500E&02	1.2285585791E-00	5.13873E-05
5.000E&02	1.2527090260E-00	5.48741E-05
6.000E&02	1.3004096384E-00	7.24967E-05
7.000E&02	1.3473913693E-00	1.13797E-04
8.000E&02	1.3937520113E-00	1.90905E-04
9.000E&02	1.4395893570E-00	3.16181E-04
1.000E&03	1.4850011990E-00	5.02809E-04

HE-0-15 1.994228 ± 0.000015 40.000015

HE-0-16 1.994312 ± 0.000013 40.000013

HE-0-17 1.994319 ± 0.000011 40.000011

HE-0-18 1.994394 ± 0.000007 40.000007

HE-0-19 1.994373 ± 0.000007 40.000007

HE-0-20 1.994375 ± 0.000013 40.000013

HE-0-21 1.994352 ± 0.000006 40.000006

HE-0-22 1.994373 ± 0.000021 40.000021

Average Z = 1.994228 ± 0.000015

Average standard error of Z = 0.000017

Standard error of SZ = single Z = ± 0.000177

1/ The value of Z for this run was obtained from the calculations

TABLE 4. - Compressibility apparatus zero pressure volume ratio

Run No.	N	Deviation from average N
HE-0-1	1.994105 \pm 0.000069	-0.000134
HE-0-2	1.994100 \pm 0.000072	-0.000139
HE-0-3	1.994013 \pm 0.000092	-0.000226
HE-0-4	1.994082 \pm 0.000039	-0.000157
HE-0-5	1.994106 \pm 0.000090	-0.000133
HE-0-6	1.994161 \pm 0.000099	-0.000078
HE-0-7	1.994222 \pm 0.000037	-0.000017
HE-0-8	1.994119 \pm 0.000042	-0.000120
HE-0-9	1.994563 \pm 0.000128	+0.000324
HE-0-10	1.994284 \pm 0.000062	+0.000045
HE-0-11	1.994214 \pm 0.000040	-0.000025
HE-0-12	1.994290 \pm 0.000058	+0.000051
<u>1/</u> HE-0-13	1.995261 \pm 0.000466	+0.001022
HE-0-14	1.994224 \pm 0.000058	-0.000015
HE-0-15	1.994257 \pm 0.000055	+0.000018
HE-0-16	1.994312 \pm 0.000013	+0.000073
HE-0-17	1.994319 \pm 0.000011	+0.000080
HE-0-18	1.994394 \pm 0.000067	+0.000155
HE-0-19	1.994273 \pm 0.000041	+0.000034
HE-0-20	1.994313 \pm 0.000033	+0.000074
HE-0-21	1.994352 \pm 0.000060	+0.000113
HE-0-22	1.994313 \pm 0.000021	+0.000074

Average N = 1.994239 \pm 0.000028Average standard error of N = \pm 0.000057Standard error of a single N = \pm 0.0001271/ The value of N for this run was omitted from the calculations.

TABLE 5. - Values for the constant B of equation (2) for helium
at 0° C

Run No.	$B \times 10^4, \text{ atm}^{-1}$	(Deviation from average B) $\times 10^4, \text{ atm}^{-1}$
HE-0-1	5.36119 ± 0.01214	+0.01717
HE-0-2	5.36045 ± 0.01204	+0.01643
HE-0-3	5.37420 ± 0.01503	+0.03018
HE-0-4	5.36139 ± 0.00638	+0.01737
HE-0-5	5.36533 ± 0.01483	+0.02131
HE-0-6	5.34795 ± 0.01618	+0.00393
HE-0-7	5.34434 ± 0.00608	+0.00032
HE-0-8	5.35918 ± 0.00697	+0.01516
HE-0-9	5.29109 ± 0.02146	-0.05293
HE-0-10	5.33901 ± 0.01006	-0.00501
HE-0-11	5.34960 ± 0.00658	+0.00558
HE-0-12	5.33587 ± 0.00950	-0.00815
<u>1</u> /HE-0-13	5.03189 ± 0.07537	-0.31213
HE-0-14	5.34649 ± 0.00948	+0.00247
HE-0-15	5.34390 ± 0.00895	-0.00012
HE-0-16	5.33504 ± 0.00219	-0.00898
HE-0-17	5.33533 ± 0.00183	-0.00869
HE-0-18	5.32284 ± 0.01094	-0.02118
HE-0-19	5.34633 ± 0.00673	+0.00231
HE-0-20	5.33893 ± 0.00549	-0.00509
HE-0-21	5.32604 ± 0.00900	-0.01798
HE-0-22	5.33984 ± 0.00405	-0.00418

Average B = $5.34402 \times 10^{-4} \pm 0.00390 \times 10^{-4} \text{ atm}^{-1}$ Average standard error of B = $\pm 0.00933 \times 10^{-4} \text{ atm}^{-1}$ Standard error of a single B = $\pm 0.01787 \times 10^{-4} \text{ atm}^{-1}$ 1/ The value of B for this run was omitted from the calculations.

TABLE 6. - Values for the constant C of equation (2) for helium at 0° C

Run No.	$C \times 10^8, \text{ atm}^{-2}$	(Deviation from average C) $\times 10^8, \text{ atm}^{-2}$
HE-0-1	-6.9442 ± 0.3126	-0.4278
HE-0-2	-6.8916 ± 0.2918	-0.3752
HE-0-3	-7.0908 ± 0.3587	-0.5744
HE-0-4	-6.8403 ± 0.1514	-0.3239
HE-0-5	-7.0146 ± 0.3556	-0.4982
HE-0-6	-6.4880 ± 0.3854	+0.0284
HE-0-7	-6.5287 ± 0.1450	-0.0123
HE-0-8	-6.9119 ± 0.1665	-0.3955
HE-0-9	-5.2308 ± 0.5243	+1.2856
HE-0-10	-6.4421 ± 0.2382	+0.0743
HE-0-11	-6.6754 ± 0.1566	-0.1590
HE-0-12	-6.3506 ± 0.2274	+0.1658
<u>1</u> /HE-0-13	$+2.9380 \pm 1.7767$	+9.4544
HE-0-14	-6.6043 ± 0.2271	-0.0879
HE-0-15	-6.4963 ± 0.2120	+0.0201
HE-0-16	-6.3372 ± 0.0520	+0.1792
HE-0-17	-6.3395 ± 0.0439	+0.1769
HE-0-18	-6.0604 ± 0.2599	+0.4560
HE-0-19	-6.5835 ± 0.1619	-0.0671
HE-0-20	-6.4144 ± 0.1337	+0.1020
HE-0-21	-6.0723 ± 0.1959	+0.4441
HE-0-22	-6.5282 ± 0.1152	-0.0118

Average C = $-6.5164 \times 10^{-8} \pm 0.0895 \times 10^{-8} \text{ atm}^{-2}$

Average standard error of C = $\pm 0.2245 \times 10^{-8} \text{ atm}^{-2}$

Standard error of a single C = $\pm 0.4103 \times 10^{-8} \text{ atm}^{-2}$

1/ The value of C for this run was omitted from the calculations.

Values for the constant D of equation (2) for helium at 0°C are recorded in table 7 for each of the twenty-two runs along with the average D , the standard error of the average D , the average standard error of D , and the standard error of a single D .

Values for the compressibility factor (Z) for helium at 0°C and 1 atmosphere calculated from equation (2) are recorded in table 8 for each of the twenty-two runs. The average Z , the standard error of the average Z , the average standard error of Z , and the standard error of a single Z for helium at 0°C and 1 atmosphere are recorded in table 8.

Values for the compressibility factor (Z) for helium at 0°C and 700 atmospheres calculated from equation (2) are recorded in table 9. The average Z , the standard error of the average Z , the average standard error of Z , and the standard error of a single Z for helium at 0°C and 700 atmospheres are recorded in table 9.

Data for Run No. HE-0-13 are not consistent with the data of the other runs; therefore, data for Run No. HE-0-13 were omitted from the calculations of the various average quantities and standard errors of tables 4, 5, 6, 7, 8, and 9.

Examination of tables 4, 5, 6, 7, 8, and 9 reveals that the deviations of Run No. HE-0-9 from the various tabulated average quantities are about three times the calculated standard errors of the single measurements; therefore, the possibility of an error exists in the data of Run No. HE-0-9. Additional tables were prepared omitting the data for Run No. HE-0-9 and Run No. HE-0-13 from the calculations of the various average quantities and standard errors.

TABLE 7. - Values for the constant D of equation (2) for helium at 0° C

Run No.	$D \times 10^{11}, \text{atm}^{-3}$	(Deviation from average D) $\times 10^{11}, \text{atm}^{-3}$
HE-0-1	1.910 ± 0.277	+0.384
HE-0-2	1.833 ± 0.243	+0.307
HE-0-3	1.932 ± 0.294	+0.406
HE-0-4	1.764 ± 0.124	+0.238
HE-0-5	1.938 ± 0.293	+0.412
HE-0-6	1.463 ± 0.316	-0.063
HE-0-7	1.530 ± 0.119	+0.004
HE-0-8	1.867 ± 0.137	+0.341
HE-0-9	0.453 ± 0.440	-1.073
HE-0-10	1.473 ± 0.194	-0.053
HE-0-11	1.658 ± 0.128	+0.132
HE-0-12	1.394 ± 0.187	-0.132
<u>1</u> /HE-0-13	-6.798 ± 1.440	-8.324
HE-0-14	1.600 ± 0.187	+0.074
HE-0-15	1.494 ± 0.173	-0.032
HE-0-16	1.387 ± 0.042	-0.139
HE-0-17	1.383 ± 0.036	-0.143
HE-0-18	1.162 ± 0.212	-0.364
HE-0-19	1.580 ± 0.134	+0.054
HE-0-20	1.447 ± 0.112	-0.079
HE-0-21	1.147 ± 0.146	-0.379
HE-0-22	1.630 ± 0.113	+0.104

Average $D = 1.526 \times 10^{-11} \pm 0.074 \times 10^{-11} \text{atm}^{-3}$

Average standard error of $D = \pm 0.186 \times 10^{-11} \text{atm}^{-3}$

Standard error of a single $D = \pm 0.338 \times 10^{-11} \text{atm}^{-3}$

1/ The value of D for this run was omitted from the calculations.

TABLE 7. - Values for the constant D of equation (2) for helium at 0° C.

Run No.	$D \times 10^{11}$, cm ² sec ⁻¹	(Deviation from average D) $\times 10^{11}$, cm ² sec ⁻¹
HE-0-1	1.910 ± 0.277	+0.387
HE-0-2	1.893 ± 0.243	+0.307
HE-0-3	1.972 ± 0.294	+0.406
HE-0-4	1.762 ± 0.150	+0.278
HE-0-5	1.938 ± 0.203	+0.412
HE-0-6	1.462 ± 0.310	-0.083
HE-0-7	1.730 ± 0.119	+0.004
HE-0-8	1.667 ± 0.137	+0.361
HE-0-9	0.437 ± 0.400	-1.073
HE-0-10	1.472 ± 0.104	-0.083
HE-0-11	1.628 ± 0.120	+0.131
HE-0-12	1.704 ± 0.181	-0.132
HE-0-13	4.798 ± 1.000	-3.738
HE-0-14	1.600 ± 0.187	+0.344
HE-0-15	1.494 ± 0.173	-0.072
HE-0-16	1.767 ± 0.043	-0.179
HE-0-17	1.783 ± 0.036	-0.143
HE-0-18	1.162 ± 0.512	-0.304
HE-0-19	1.700 ± 0.130	+0.390
HE-0-20	1.447 ± 0.112	-0.070
HE-0-21	1.147 ± 0.100	-0.179
HE-0-22	1.670 ± 0.113	+0.100

Average $D = 1.526 \times 10^{-11} \pm 0.072 \times 10^{-11}$ cm² sec⁻¹
 Average standard error of $D = \pm 0.166 \times 10^{-11}$ cm² sec⁻¹
 Standard error of a single $D = \pm 0.738 \times 10^{-11}$ cm² sec⁻¹

1/ The value of D for this run was omitted from the average.

TABLE 8. - Compressibility factor for helium at 0° C and 1 atmosphere
calculated from equation (2)

Run No.	Compressibility factor, Z	Deviation from average Z
HE-0-1	1.000536049 \pm 0.000001282	+0.000001712
HE-0-2	1.000535976 \pm 0.000001277	+0.000001639
HE-0-3	1.000537349 \pm 0.000001595	+0.000003012
HE-0-4	1.000536071 \pm 0.000000677	+0.000001734
HE-0-5	1.000536463 \pm 0.000001573	+0.000002126
HE-0-6	1.000534730 \pm 0.000001718	+0.000000393
HE-0-7	1.000534369 \pm 0.000000645	+0.000000032
HE-0-8	1.000535849 \pm 0.000000740	+0.000001512
HE-0-9	1.000529057 \pm 0.000002273	-0.000005280
HE-0-10	1.000533837 \pm 0.000001068	-0.000000500
HE-0-11	1.000534893 \pm 0.000000698	+0.000000556
HE-0-12	1.000533524 \pm 0.000001008	-0.000000813
<u>1</u> /HE-0-13	1.000503218 \pm 0.000007978	-0.000031119
HE-0-14	1.000534583 \pm 0.000001005	+0.000000246
HE-0-15	1.000534325 \pm 0.000000950	-0.000000012
HE-0-16	1.000533441 \pm 0.000000233	-0.000000896
HE-0-17	1.000533470 \pm 0.000000194	-0.000000867
HE-0-18	1.000532224 \pm 0.000001161	-0.000002113
HE-0-19	1.000534567 \pm 0.000000714	+0.000000230
HE-0-20	1.000533829 \pm 0.000000581	-0.000000508
HE-0-21	1.000532544 \pm 0.000000962	-0.000001793
HE-0-22	1.000533919 \pm 0.000000424	-0.000000418

Average Z = 1.000534337 \pm 0.000000389

Average standard error of Z = \pm 0.000000989

Standard error of a single Z = \pm 0.000001782

1/ The value of Z for this run was omitted from the calculations.

TABLE 9. - Compressibility factor for helium at 0° C and 700 atmospheres calculated from equation (2)

Run No.	Compressibility factor, Z	Deviation from average Z
HE-0-1	1.347806 \pm 0.000276	+0.000421
HE-0-2	1.347750 \pm 0.000250	+0.000365
HE-0-3	1.348077 \pm 0.000306	+0.000692
HE-0-4	1.347830 \pm 0.000129	+0.000445
HE-0-5	1.347850 \pm 0.000304	+0.000465
HE-0-6	1.347583 \pm 0.000329	+0.000198
HE-0-7	1.347362 \pm 0.000124	-0.000023
HE-0-8	1.347677 \pm 0.000142	+0.000292
HE-0-9	1.346299 \pm 0.000449	-0.001086
HE-0-10	1.347218 \pm 0.000203	-0.000167
HE-0-11	1.347449 \pm 0.000134	+0.000064
HE-0-12	1.347173 \pm 0.000194	-0.000212
<u>1</u> /HE-0-13	1.343313 \pm 0.001512	-0.004072
HE-0-14	1.347381 \pm 0.000194	-0.000004
HE-0-15	1.347367 \pm 0.000181	-0.000018
HE-0-16	1.347158 \pm 0.000044	-0.000227
HE-0-17	1.347155 \pm 0.000037	-0.000230
HE-0-18	1.346889 \pm 0.000221	-0.000496
HE-0-19	1.347401 \pm 0.000138	+0.000016
HE-0-20	1.347257 \pm 0.000115	-0.000128
HE-0-21	1.347004 \pm 0.000171	-0.000381
HE-0-22	1.347391 \pm 0.000114	+0.000006

Average Z = 1.347385 \pm 0.000086

Average standard error of Z = \pm 0.000193

Standard error of a single Z = \pm 0.000394

1/ The value of Z for this run was omitted from the calculations.

Table 10 contains values of the compressibility apparatus zero pressure volume ratio (N), the average N , the standard error in the average N , the average standard error of N , and the standard error of a single N . Data for Run No. HE-0-9 and Run No. HE-0-13 were omitted from the calculations of the average N and the various standard errors of table 10.

Table 11 contains values of the constant B of equation (2) for helium at 0°C , the average B , the standard error of the average B , the average standard error of B , and the standard error of a single B . Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculation of the average B or the various standard errors of table 11.

Table 12 contains values of the constant C of equation (2) for helium at 0°C , the average C , the standard error of the average C , the average standard error of C , and the standard error of a single C . Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculation of the average C or the various standard errors of table 12.

Table 13 contains values of the constant D of equation (2) for helium at 0°C , the average D , the standard error of the average D , the average standard error of D , and the standard error of a single D . Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculation of the average D or the various standard errors of table 13.

Table 14 contains compressibility factors for helium at 0°C and 1 atmosphere calculated from equation (2), the average value of

TABLE 10. - Compressibility apparatus zero pressure volume ratio,
Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	N	Deviation from average N
HE-0-1	1.994105 \pm 0.000069	-0.000118
HE-0-2	1.994100 \pm 0.000072	-0.000123
HE-0-3	1.994013 \pm 0.000092	-0.000210
HE-0-4	1.994082 \pm 0.000039	-0.000141
HE-0-5	1.994106 \pm 0.000090	-0.000117
HE-0-6	1.994161 \pm 0.000099	-0.000062
HE-0-7	1.994222 \pm 0.000037	-0.000001
HE-0-8	1.994119 \pm 0.000042	-0.000104
<u>1</u> /HE-0-9	1.994563 \pm 0.000128	+0.000340
HE-0-10	1.994284 \pm 0.000062	+0.000061
HE-0-11	1.994214 \pm 0.000040	-0.000009
HE-0-12	1.994290 \pm 0.000058	+0.000067
<u>1</u> /HE-0-13	1.995261 \pm 0.000466	+0.001038
HE-0-14	1.994224 \pm 0.000058	+0.000001
HE-0-15	1.994257 \pm 0.000055	+0.000034
HE-0-16	1.994312 \pm 0.000013	+0.000089
HE-0-17	1.994319 \pm 0.000011	+0.000096
HE-0-18	1.994394 \pm 0.000067	+0.000171
HE-0-19	1.994273 \pm 0.000041	+0.000050
HE-0-20	1.994313 \pm 0.000033	+0.000090
HE-0-21	1.994352 \pm 0.000060	+0.000129
HE-0-22	1.994313 \pm 0.000021	+0.000090

Average N = 1.994223 \pm 0.000024

Average standard error of N = \pm 0.000053

Standard error of a single N = \pm 0.000106

1/ The value of N for this run was omitted from the calculations.

TABLE 11. - Values for the constant B of equation (2) for helium at 0° C, Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	$B \times 10^4, \text{ atm}^{-1}$	(Deviation from average B) $\times 10^4, \text{ atm}^{-1}$
HE-0-1	5.36119 ± 0.01214	+0.01453
HE-0-2	5.36045 ± 0.01204	+0.01379
HE-0-3	5.37420 ± 0.01503	+0.02754
HE-0-4	5.36139 ± 0.00638	+0.01473
HE-0-5	5.36533 ± 0.01483	+0.01867
HE-0-6	5.34795 ± 0.01618	+0.00129
HE-0-7	5.34434 ± 0.00608	-0.00232
HE-0-8	5.35918 ± 0.00697	+0.01252
<u>1</u> /HE-0-9	5.29109 ± 0.02146	-0.05557
HE-0-10	5.33901 ± 0.01006	-0.00765
HE-0-11	5.34960 ± 0.00658	+0.00294
HE-0-12	5.33587 ± 0.00950	-0.01079
<u>1</u> /HE-0-13	5.03189 ± 0.07537	-0.31477
HE-0-14	5.34649 ± 0.00948	-0.00017
HE-0-15	5.34390 ± 0.00895	-0.00276
HE-0-16	5.33504 ± 0.00219	-0.01162
HE-0-17	5.33533 ± 0.00183	-0.01133
HE-0-18	5.32284 ± 0.01094	-0.02382
HE-0-19	5.34633 ± 0.00673	-0.00033
HE-0-20	5.33893 ± 0.00549	-0.00773
HE-0-21	5.32604 ± 0.00900	-0.02062
HE-0-22	5.33984 ± 0.00405	-0.00682

Average B = $5.34666 \times 10^{-4} \pm 0.00301 \times 10^{-4} \text{ atm}^{-1}$

Average standard error of B = $\pm 0.00872 \times 10^{-4} \text{ atm}^{-1}$

Standard error of a single B = $\pm 0.01346 \text{ atm}^{-1}$

1/ The value of B for this run was omitted from the calculations.

TABLE 12. - Values for the constant C of equation (2) for helium at 0° C, Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	$C \times 10^8, \text{ atm}^{-2}$	(Deviation from average C) $\times 10^8, \text{ atm}^{-2}$
HE-0-1	-6.9442 ± 0.3126	-0.3635
HE-0-2	-6.8916 ± 0.2918	-0.3109
HE-0-3	-7.0908 ± 0.3587	-0.5101
HE-0-4	-6.8403 ± 0.1514	-0.2596
HE-0-5	-7.0146 ± 0.3556	-0.4339
HE-0-6	-6.4880 ± 0.3854	+0.0927
HE-0-7	-6.5287 ± 0.1450	+0.0520
HE-0-8	-6.9119 ± 0.1665	-0.3312
<u>1</u> /HE-0-9	-5.2308 ± 0.5243	+1.3499
HE-0-10	-6.4421 ± 0.2382	+0.1386
HE-0-11	-6.6754 ± 0.1566	-0.0947
HE-0-12	-6.3506 ± 0.2274	+0.2301
<u>1</u> /HE-0-13	$+2.9380 \pm 1.7767$	+9.5187
HE-0-14	-6.6043 ± 0.2271	-0.0236
HE-0-15	-6.4963 ± 0.2120	+0.0844
HE-0-16	-6.3372 ± 0.0520	+0.2435
HE-0-17	-6.3395 ± 0.0439	+0.2412
HE-0-18	-6.0604 ± 0.2599	+0.5203
HE-0-19	-6.5835 ± 0.1619	-0.0028
HE-0-20	-6.4144 ± 0.1337	+0.1663
HE-0-21	-6.0723 ± 0.1959	+0.5084
HE-0-22	-6.5282 ± 0.1152	+0.0525

Average C = $-6.5807 \times 10^{-8} \pm 0.0655 \times 10^{-8} \text{ atm}^{-2}$

Average standard error of C = $\pm 0.2095 \times 10^{-8} \text{ atm}^{-2}$

Standard error of a single C = $\pm 0.2930 \times 10^{-8} \text{ atm}^{-2}$

1/ The value of C for this run was omitted from the calculations.

TABLE 13. - Values for the constant D of equation (2) for helium at
0° C, Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	D x 10 ¹¹ , atm ⁻³	(Deviation from average D) x 10 ¹¹ , atm ⁻³
HE-0-1	1.910 ± 0.277	+0.330
HE-0-2	1.833 ± 0.243	+0.253
HE-0-3	1.932 ± 0.294	+0.352
HE-0-4	1.764 ± 0.124	+0.184
HE-0-5	1.938 ± 0.293	+0.358
HE-0-6	1.463 ± 0.316	-0.117
HE-0-7	1.530 ± 0.119	-0.050
HE-0-8	1.867 ± 0.137	+0.287
<u>1</u> /HE-0-9	0.453 ± 0.440	-1.127
HE-0-10	1.473 ± 0.194	-0.107
HE-0-11	1.658 ± 0.128	+0.078
HE-0-12	1.394 ± 0.187	-0.186
<u>1</u> /HE-0-13	-6.798 ± 1.440	-8.378
HE-0-14	1.600 ± 0.187	+0.202
HE-0-15	1.494 ± 0.173	-0.086
HE-0-16	1.387 ± 0.042	-0.193
HE-0-17	1.383 ± 0.036	-0.197
HE-0-18	1.162 ± 0.212	-0.418
HE-0-19	1.580 ± 0.134	0.000
HE-0-20	1.447 ± 0.112	-0.133
HE-0-21	1.147 ± 0.146	-0.433
HE-0-22	1.630 ± 0.113	+0.050

Average D = 1.580 x 10⁻¹¹ ± 0.053 x 10⁻¹¹ atm⁻³

Average standard error of D = ± 0.173 x 10⁻¹¹ atm⁻³

Standard error of a single D = ± 0.238 x 10⁻¹¹ atm⁻³

1/ The value of D for this run was omitted from the calculations.

TABLE 14. - Compressibility factor for helium at 0° C and 1 atmosphere calculated from equation (2), Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	Compressibility factor, Z	Deviation from average Z
HE-0-1	1.000536049 \pm 0.000001282	+0.000001448
HE-0-2	1.000535976 \pm 0.000001277	+0.000001375
HE-0-3	1.000537349 \pm 0.000001595	+0.000002748
HE-0-4	1.000536071 \pm 0.000000677	+0.000001470
HE-0-5	1.000536463 \pm 0.000001573	+0.000001862
HE-0-6	1.000534730 \pm 0.000001718	+0.000000129
HE-0-7	1.000534369 \pm 0.000000645	-0.000000232
HE-0-8	1.000535849 \pm 0.000000740	+0.000001248
<u>1</u> /HE-0-9	1.000529057 \pm 0.000002273	-0.000005544
HE-0-10	1.000533837 \pm 0.000001068	-0.000000764
HE-0-11	1.000534893 \pm 0.000000698	+0.000000292
HE-0-12	1.000533524 \pm 0.000001008	-0.000001077
<u>1</u> /HE-0-13	1.000503218 \pm 0.000007978	-0.000031383
HE-0-14	1.000534583 \pm 0.000001005	-0.000000018
HE-0-15	1.000534325 \pm 0.000000950	-0.000000276
HE-0-16	1.000533441 \pm 0.000000233	-0.000001160
HE-0-17	1.000533470 \pm 0.000000194	-0.000001131
HE-0-18	1.000532224 \pm 0.000001161	-0.000002377
HE-0-19	1.000534567 \pm 0.000000714	-0.000000034
HE-0-20	1.000533829 \pm 0.000000581	-0.000000772
HE-0-21	1.000532544 \pm 0.000000962	-0.000002057
HE-0-22	1.000533919 \pm 0.000000424	-0.000000682

Average Z = 1.000534601 \pm 0.000000300

Average standard error of Z = \pm 0.000000925

Standard error of a single Z = \pm 0.000001343

1/ The value of Z for this run was omitted from the calculations.

TABLE 1A - Compressibility Factor for Air at 0° C and 1 atmosphere calculated from equation (2), Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	Compressibility Factor, Z	Deviation from average Z
HE-0-1	$1.000236049 \pm 0.00001282$	+0.00001448
HE-0-2	$1.000235316 \pm 0.00001277$	+0.00001375
HE-0-3	$1.000237149 \pm 0.00001292$	+0.00002788
HE-0-4	$1.000236071 \pm 0.00001277$	+0.00001470
HE-0-5	$1.00023685 \pm 0.00001273$	+0.00001861
HE-0-6	$1.000234730 \pm 0.00001218$	+0.00000128
HE-0-7	$1.000234368 \pm 0.00000842$	-0.00000072
HE-0-8	$1.000235828 \pm 0.00000840$	+0.00001548
HE-0-9	$1.000235927 \pm 0.00000873$	-0.00000584
HE-0-10	$1.000233937 \pm 0.00000868$	-0.00000084
HE-0-11	$1.000234893 \pm 0.00000858$	+0.00000082
HE-0-12	$1.000233214 \pm 0.00000868$	-0.00000107
HE-0-13	$1.000235218 \pm 0.00000878$	-0.00000183
HE-0-14	$1.000234281 \pm 0.00000868$	-0.00000018
HE-0-15	$1.000234222 \pm 0.00000868$	-0.00000036
HE-0-16	$1.00023441 \pm 0.00000873$	-0.00000150
HE-0-17	$1.00023470 \pm 0.00000868$	-0.00000111
HE-0-18	$1.000232234 \pm 0.00000861$	-0.00000277
HE-0-19	$1.000234247 \pm 0.00000874$	-0.00000016
HE-0-20	$1.000233829 \pm 0.00000881$	-0.00000072
HE-0-21	$1.000232548 \pm 0.00000872$	-0.00000027
HE-0-22	$1.000233219 \pm 0.00000874$	-0.00000022

Average Z = $1.000234621 \pm 0.00000870$
 Average standard error of Z = ± 0.00000872
 Standard error of a single Z = ± 0.00001347

1/ The value of Z for this run was omitted from the calculations

the compressibility factor (Z), the standard error of the average Z , the average standard error of Z , and the standard error of a single Z . Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculation of the average Z or the various standard errors of table 14.

Table 15 contains compressibility factors for helium at 0°C and 700 atmospheres calculated from equation (2), the average value of the compressibility factor (Z), the standard error of the average Z , the average standard error of Z , and the standard error of a single Z . Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculations of the average Z or the various standard errors of table 15.

Tables of pressure residuals ($P_{\text{obs.}} - P_{\text{cal.}}$) were compiled for all of the runs with initial pressures (P_0) of about 700 atmospheres. The tables were prepared for expansion numbers 1, 2, ... 7. Data for Run No. HE-0-9 and Run No. HE-0-13 were not used in the calculations of the average pressure residuals or the various standard errors.

The signs of the pressure residuals should be random among the various runs at the same expansion number, provided the experimental data are adequately represented by the selected functional form.

Tables of residuals were prepared for the experimental data fitted to equation (1), and for the experimental data fitted to equation (2). Table 5 of Helium Research Center Internal Report No. 88 (3) was used to prepare tables 16, 17, 18, 19, 20, 21, and 22 of this report. Table 1 of this report was used to prepare tables 23, 24, 25, 26, 27, 28, and 29 of this report.

TABLE 15. - Compressibility factor for helium at 0° C and 700 atmospheres calculated from equation (2), Run No. HE-0-9 and Run No. HE-0-13 omitted

Run No.	Compressibility factor, Z	Deviation from average Z
HE-0-1	1.347806 \pm 0.000276	+0.000367
HE-0-2	1.347750 \pm 0.000250	+0.000311
HE-0-3	1.348077 \pm 0.000306	+0.000638
HE-0-4	1.347830 \pm 0.000129	+0.000391
HE-0-5	1.347850 \pm 0.000304	+0.000411
HE-0-6	1.347583 \pm 0.000329	+0.000144
HE-0-7	1.347362 \pm 0.000124	-0.000077
HE-0-8	1.347677 \pm 0.000142	+0.000238
<u>1</u> /HE-0-9	1.346299 \pm 0.000449	-0.001140
HE-0-10	1.347218 \pm 0.000203	-0.000221
HE-0-11	1.347449 \pm 0.000134	+0.000010
HE-0-12	1.347173 \pm 0.000194	-0.000266
<u>1</u> /HE-0-13	1.343313 \pm 0.001512	-0.004126
HE-0-14	1.347381 \pm 0.000194	-0.000058
HE-0-15	1.347367 \pm 0.000181	-0.000072
HE-0-16	1.347158 \pm 0.000044	-0.000281
HE-0-17	1.347155 \pm 0.000037	-0.000284
HE-0-18	1.346889 \pm 0.000221	-0.000550
HE-0-19	1.347401 \pm 0.000138	-0.000038
HE-0-20	1.347257 \pm 0.000115	-0.000182
HE-0-21	1.347004 \pm 0.000171	-0.000435
HE-0-22	1.347391 \pm 0.000114	-0.000048

Average Z = 1.347439 \pm 0.000070

Average standard error of Z = \pm 0.000180

Standard error of a single Z = \pm 0.000313

1/ The value of Z for this run was omitted from the calculations.

TABLE 16. - Pressure residuals for the experimental data fitted to equation (1), R=1

Run No.	(P,obs.-P,cal.) $\times 10^4$, atm	Deviation from average (P,obs.-P,cal.) $\times 10^4$, atm
HE-0-2	-4.495	-0.381
HE-0-3	-4.991	-0.877
HE-0-4	-4.694	-0.580
HE-0-5	-4.931	-0.817
HE-0-6	-3.761	+0.353
HE-0-7	-4.009	+0.105
HE-0-8	-4.853	-0.739
<u>1</u> /HE-0-9	-1.079	+3.035
HE-0-10	-4.034	+0.080
HE-0-11	-4.376	-0.262
HE-0-12	-3.624	+0.490
<u>1</u> /HE-0-13	+19.495	+23.609
HE-0-14	-4.091	+0.023
HE-0-15	-3.999	+0.115
HE-0-16	-3.718	+0.396
HE-0-17	-3.620	+0.494
HE-0-18	-3.149	+0.965
HE-0-19	-4.067	+0.047
HE-0-20	-3.525	+0.589

Average (P,obs.-P,cal.) = $-4.114 \times 10^{-4} \pm 0.130 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.537 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 17. - Pressure residuals for the experimental data fitted to equation (1), R=2

Run No.	(P,obs.-P,cal.)x10 ³ ,atm	Deviation from average (P,obs.-P,cal.)x10 ³ ,atm
HE-0-2	+2.368	+0.160
HE-0-3	+2.640	+0.432
HE-0-4	+2.514	+0.306
HE-0-5	+2.611	+0.403
HE-0-6	+1.954	-0.254
HE-0-7	+2.151	-0.057
HE-0-8	+2.601	+0.393
<u>1</u> /HE-0-9	+0.581	-1.627
HE-0-10	+2.233	+0.025
HE-0-11	+2.353	+0.145
HE-0-12	+1.967	-0.241
<u>1</u> /HE-0-13	-11.174	-13.382
HE-0-14	+2.170	-0.038
HE-0-15	+2.142	-0.066
HE-0-16	+2.012	-0.196
HE-0-17	+1.975	-0.233
HE-0-18	+1.733	-0.475
HE-0-19	+2.219	+0.011
HE-0-20	+1.894	-0.314

Average (P,obs.-P,cal.) = $+2.208 \times 10^{-3} \pm 0.066 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.273 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 18. - Pressure residuals for the experimental data fitted to equation (1), R=3

Run No.	(P,obs.-P,cal.)x10 ³ ,atm	Deviation from average (P,obs.-P,cal.)x10 ³ ,atm
HE-0-2	-3.151	-0.015
HE-0-3	-3.565	-0.429
HE-0-4	-3.506	-0.370
HE-0-5	-3.551	-0.415
HE-0-6	-2.463	+0.673
HE-0-7	-3.035	+0.101
HE-0-8	-3.660	-0.524
<u>1</u> /HE-0-9	-0.950	+2.186
HE-0-10	-3.529	-0.393
HE-0-11	-3.355	-0.219
HE-0-12	-2.943	+0.193
<u>1</u> /HE-0-13	+19.216	+22.352
HE-0-14	-2.950	+0.186
HE-0-15	-3.023	+0.113
HE-0-16	-2.913	+0.223
HE-0-17	-2.956	+0.180
HE-0-18	-2.616	+0.520
HE-0-19	-3.355	-0.219
HE-0-20	-2.733	+0.403

Average (P,obs.-P,cal.) = $-3.136 \times 10^{-3} \pm 0.088 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.361 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 19. - Pressure residuals for the experimental data fitted to equation (1), R=4

Run No.	(P,obs.-P,cal.) $\times 10^3$, atm	Deviation from average (P,obs.-P,cal.) $\times 10^3$, atm
HE-0-2	-1.520	-0.571
HE-0-3	-1.493	-0.544
HE-0-4	-1.332	-0.383
HE-0-5	-1.399	-0.450
HE-0-6	-1.445	-0.496
HE-0-7	-1.038	-0.089
HE-0-8	-1.249	-0.300
<u>1</u> /HE-0-9	+0.538	+1.487
HE-0-10	-0.016	+0.933
HE-0-11	-0.978	-0.029
HE-0-12	-0.348	+0.601
<u>1</u> /HE-0-13	-1.904	-0.955
HE-0-14	-1.250	-0.301
HE-0-15	-0.895	+0.054
HE-0-16	-0.821	+0.128
HE-0-17	-0.580	+0.369
HE-0-18	-0.644	+0.305
HE-0-19	-0.457	+0.492
HE-0-20	-0.672	+0.277

Average (P,obs.-P,cal.) = $-0.949 \times 10^{-3} \pm 0.109 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.448 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 20. - Pressure residuals for the experimental data fitted to equation (1), R=5

Run No.	(P,obs.-P,cal.)x10 ³ ,atm	Deviation from average (P,obs.-P,cal.)x10 ³ ,atm
HE-0-2	+1.331	+0.243
HE-0-3	+1.239	+0.151
HE-0-4	+1.458	+0.370
HE-0-5	+1.181	+0.093
HE-0-6	+0.741	-0.347
HE-0-7	+1.307	+0.219
HE-0-8	+1.462	+0.374
<u>1</u> /HE-0-9	-1.009	-2.097
HE-0-10	+0.612	-0.476
HE-0-11	+1.054	-0.034
HE-0-12	+0.524	-0.564
<u>1</u> /HE-0-13	-7.595	-8.683
HE-0-14	+1.183	+0.095
HE-0-15	+0.864	-0.224
HE-0-16	+1.206	+0.118
HE-0-17	+1.139	+0.051
HE-0-18	+1.359	+0.271
HE-0-19	+1.055	-0.033
HE-0-20	+0.782	-0.306

Average (P,obs.-P,cal.) = $+1.088 \times 10^{-3} \pm 0.070 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.288 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 21. - Pressure residuals for the experimental data fitted to equation (1), R=6

Run No.	(P,obs.-P,cal.)x10 ³ ,atm	Deviation from average (P,obs.-P,cal.)x10 ³ ,atm
HE-0-2	+2.326	+0.150
HE-0-3	+2.468	+0.292
HE-0-4	+2.755	+0.579
HE-0-5	+2.412	+0.236
HE-0-6	+2.120	-0.056
HE-0-7	+1.900	-0.276
HE-0-8	+2.486	+0.310
<u>1</u> /HE-0-9	+0.246	-1.930
HE-0-10	+2.184	+0.008
HE-0-11	+2.654	+0.478
HE-0-12	+1.827	-0.349
<u>1</u> /HE-0-13	-7.179	-9.355
HE-0-14	+2.096	-0.080
HE-0-15	+2.104	-0.072
HE-0-16	+1.909	-0.267
HE-0-17	+1.883	-0.293
HE-0-18	+2.078	-0.098
HE-0-19	+1.756	-0.420
HE-0-20	+2.027	-0.149

Average (P,obs.-P,cal.) = $+2.176 \times 10^{-3} \pm 0.072 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.296 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 22. - Pressure residuals for the experimental data fitted to equation (1), R=7

Run No.	(P,obs.-P,cal.)x10 ³ ,atm	Deviation from average (P,obs.-P,cal.)x10 ³ ,atm
HE-0-2	+2.983	+0.631
HE-0-3	+3.641	+1.289
HE-0-4	+2.291	-0.061
HE-0-5	+3.599	+1.247
HE-0-6	+3.095	+0.743
HE-0-7	+2.346	-0.006
HE-0-8	+2.761	+0.409
<u>1</u> /HE-0-9	+2.127	-0.225
HE-0-10	+1.842	-0.510
HE-0-11	+2.169	-0.183
HE-0-12	+2.275	-0.077
<u>1</u> /HE-0-13	-3.728	-6.080
HE-0-14	+2.645	+0.293
HE-0-15	+2.591	+0.239
HE-0-16	+1.818	-0.534
HE-0-17	+1.505	-0.847
HE-0-18	+0.306	-2.046
HE-0-19	+2.289	-0.063
HE-0-20	+1.824	-0.528

Average (P,obs.-P,cal.) = $+2.352 \times 10^{-3} \pm 0.194 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.800 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 23. - Pressure residuals for the experimental data fitted to equation (2), R=1

Run No.	(P,obs.-P,cal.) $\times 10^5$,atm	Deviation from average (P,obs.-P,cal.) $\times 10^5$,atm
HE-0-2	+0.978	+0.545
HE-0-3	+1.064	+0.631
HE-0-4	+0.564	+0.131
HE-0-5	+0.997	+0.564
HE-0-6	+1.289	+0.856
HE-0-7	+0.426	-0.007
HE-0-8	+0.551	+0.118
<u>1</u> /HE-0-9	+0.240	-0.193
HE-0-10	-0.372	-0.805
HE-0-11	+0.414	-0.019
HE-0-12	+0.136	-0.297
<u>1</u> /HE-0-13	+7.018	+6.585
HE-0-14	+0.752	+0.319
HE-0-15	+0.545	+0.112
HE-0-16	+0.185	-0.248
HE-0-17	-0.078	-0.511
HE-0-18	-0.299	-0.732
HE-0-19	-0.060	-0.493
HE-0-20	+0.263	-0.170

Average (P,obs.-P,cal.) = $+0.433 \times 10^{-5} \pm 0.118 \times 10^{-5}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.485 \times 10^{-5}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 24. - Pressure residuals for the experimental data fitted to equation (2), R=2

Run No.	(P,obs.-P,cal.)x10 ⁴ ,atm	Deviation from average (P,obs.-P,cal.)x10 ⁴ ,atm
HE-0-2	-1.251	-0.713
HE-0-3	-1.338	-0.800
HE-0-4	-0.737	-0.199
HE-0-5	-1.245	-0.707
HE-0-6	-1.636	-1.098
HE-0-7	-0.543	-0.005
HE-0-8	-0.700	-0.162
<u>1</u> /HE-0-9	-0.173	+0.365
HE-0-10	+0.547	+1.085
HE-0-11	-0.517	+0.021
HE-0-12	-0.112	+0.426
<u>1</u> /HE-0-13	-9.217	-8.679
HE-0-14	-0.959	-0.421
HE-0-15	-0.667	-0.129
HE-0-16	-0.237	+0.301
HE-0-17	+0.107	+0.645
HE-0-18	+0.343	+0.881
HE-0-19	+0.120	+0.658
HE-0-20	-0.314	+0.224

Average (P,obs.-P,cal.) = $-0.538 \times 10^{-4} \pm 0.151 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.624 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 25. - Pressure residuals for the experimental data fitted to equation (2), R=3

Run No.	(P,obs.-P,cal.)x10 ⁴ ,atm	Deviation from average (P,obs.-P,cal.)x10 ⁴ ,atm
HE-0-2	+5.273	+3.196
HE-0-3	+5.357	+3.280
HE-0-4	+3.221	+1.144
HE-0-5	+4.908	+2.831
HE-0-6	+6.688	+4.611
HE-0-7	+2.252	+0.175
HE-0-8	+2.875	+0.798
<u>1</u> /HE-0-9	-0.681	-2.758
HE-0-10	-3.056	-5.133
HE-0-11	+2.007	-0.070
HE-0-12	-0.190	-2.267
<u>1</u> /HE-0-13	+40.386	+38.309
HE-0-14	+3.981	+1.904
HE-0-15	+2.458	+0.381
HE-0-16	+0.980	-1.097
HE-0-17	-0.532	-2.609
HE-0-18	-1.028	-3.105
HE-0-19	-0.954	-3.031
HE-0-20	+1.070	-1.007

Average (P,obs.-P,cal.) = $+2.077 \times 10^{-4} \pm 0.651 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 2.685 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 26. - Pressure residuals for the experimental data fitted to equation (2), R=4

Run No.	(P,obs.-P,cal.)x10 ⁴ ,atm	Deviation from average (P,obs.-P,cal.)x10 ⁴ ,atm
HE-0-2	-6.425	-4.875
HE-0-3	-5.186	-3.636
HE-0-4	-4.243	-2.693
HE-0-5	-4.380	-2.830
HE-0-6	-7.018	-5.468
HE-0-7	-2.635	-1.085
HE-0-8	-3.108	-1.558
<u>1</u> /HE-0-9	+7.490	+9.040
HE-0-10	+7.472	+9.022
HE-0-11	-1.342	+0.208
HE-0-12	+3.467	+5.017
<u>1</u> /HE-0-13	-54.997	-53.447
HE-0-14	-4.542	-2.992
HE-0-15	-1.202	+0.348
HE-0-16	-1.074	+0.476
HE-0-17	+1.098	+2.648
HE-0-18	-0.477	+1.073
HE-0-19	+3.188	+4.738
HE-0-20	+0.063	+1.613

Average (P,obs.-P,cal.) = $-1.550 \times 10^{-4} \pm 0.929 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 3.831 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 27. - Pressure residuals for the experimental data fitted to equation (2), R=5

Run No.	(P,obs.-P,cal.)x10 ⁴ ,atm	Deviation from average (P,obs.-P,cal.)x10 ⁴ ,atm
HE-0-2	-2.438	+1.004
HE-0-3	-5.175	-1.733
HE-0-4	-1.827	+1.615
HE-0-5	-5.499	-2.057
HE-0-6	-6.010	-2.568
HE-0-7	-0.900	+2.542
HE-0-8	-2.286	+1.156
<u>1</u> /HE-0-9	-13.858	-10.416
HE-0-10	-7.693	-4.251
HE-0-11	-4.698	-1.256
HE-0-12	-7.282	-3.840
<u>1</u> /HE-0-13	-10.953	-7.511
HE-0-14	-2.509	+0.933
HE-0-15	-5.372	-1.930
HE-0-16	-0.845	+2.597
HE-0-17	-1.050	+2.392
HE-0-18	+2.820	+6.262
HE-0-19	-3.408	+0.034
HE-0-20	-4.337	-0.895

Average (P,obs.-P,cal.) = $-3.442 \times 10^{-4} \pm 0.655 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 2.701 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 28. - Pressure residuals for the experimental data fitted to equation (2), R=6

Run No.	(P,obs.-P,cal.) $\times 10^4$, atm	Deviation from average (P,obs.-P,cal.) $\times 10^4$, atm
HE-0-2	+0.546	-0.293
HE-0-3	-0.630	-1.469
HE-0-4	+3.923	+3.084
HE-0-5	-0.836	-1.675
HE-0-6	+1.872	+1.033
HE-0-7	-1.124	-1.963
HE-0-8	+0.493	-0.346
<u>1</u> /HE-0-9	-2.987	-3.826
HE-0-10	+1.949	+1.110
HE-0-11	+4.586	+3.747
HE-0-12	+0.220	-0.619
<u>1</u> /HE-0-13	+21.818	+20.979
HE-0-14	+0.293	-0.546
HE-0-15	+0.869	+0.030
HE-0-16	+0.506	-0.333
HE-0-17	+0.911	+0.072
HE-0-18	+0.527	-0.312
HE-0-19	-2.565	-3.404
HE-0-20	+2.724	+1.885

Average (P,obs.-P,cal.) = $+0.839 \times 10^{-4} \pm 0.433 \times 10^{-4}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 1.784 \times 10^{-4}$ atm

1/ Data for this run were omitted from the calculations.

TABLE 29. - Pressure residuals for the experimental data fitted to equation (2), R=7

Run No.	(P,obs.-P,cal.)x10 ³ , atm	Deviation from average (P,obs.-P,cal.)x10 ³ , atm
HE-0-2	+0.969	+0.446
HE-0-3	+1.398	+0.875
HE-0-4	+0.198	-0.325
HE-0-5	+1.387	+0.864
HE-0-6	+1.383	+0.860
HE-0-7	+0.563	+0.040
HE-0-8	+0.601	+0.078
<u>1</u> /HE-0-9	+1.645	+1.122
HE-0-10	+0.080	-0.443
HE-0-11	+0.224	-0.299
HE-0-12	+0.675	+0.152
<u>1</u> /HE-0-13	+4.565	+4.042
HE-0-14	+0.814	+0.291
HE-0-15	+0.804	+0.281
HE-0-16	+0.171	-0.352
HE-0-17	-0.083	-0.606
HE-0-18	-1.068	-1.591
HE-0-19	+0.505	-0.018
HE-0-20	+0.269	-0.254

Average (P,obs.-P,cal.) = $+0.523 \times 10^{-3} \pm 0.150 \times 10^{-3}$ atm

Standard error of a single (P,obs.-P,cal.) = $\pm 0.619 \times 10^{-3}$ atm

1/ Data for this run were omitted from the calculations.

DISCUSSION OF RESULTS

A comparison of table 5 of Internal Report No. 88 (3) with table 1 of this report shows smaller pressure residuals ($P_{\text{obs.}} - P_{\text{cal.}}$) and smaller sums of the squares of the residuals when the 0°C helium compressibility data are fitted to equation (2).

The signs of the pressure residuals are not random when the experimental data are fitted to equation (1). This can be observed in tables 16 through 22.

The signs of the pressure residuals are somewhat random when the experimental data are fitted to equation (2). This can be discovered by examination of tables 23 through 29.

I conclude that equation (2) is a better representation than equation (1) of the 0°C helium compressibility data of this investigation.

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